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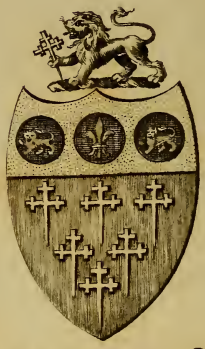

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A

TREATISE

OF THE

MATERIA MEDICA.

A

TREATISE

OF THE

MATERIA MEDICA,

By WILLIAM CULLEN, M.D.

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OF THE ROYAL COLLEGE OF PHYSICIANS OF MADRID,
OF THE AMERICAN PHILOSOPHICAL SOCIETY OF PHILADELPHIA,
OF THE MEDICAL SOCIETY OF COPENHAGEN,
OF THE MEDICAL SOCIETY OF DUBLIN,
OF THE ROYAL MEDICAL, AND OF THE ROYAL PHYSICO-MEDICAL, SOCIETIES
OF EDINBURGH.

IN TWO VOLUMES.

VOL. I.

DUBLIN:

Printed for LUKE WHITE, Dame-Street.

M DCC LXXXIX.

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PREFACE.

THE Lectures on the Materia Medica formerly publiſhed in my name, though very incorrect, were ſo well received by the public, that notwithſtanding my endeavours to prevent it, they have been ſeveral times reprinted, and even tranſlated into foreign languages.

This mark of public favour led me to think of giving a more correct and complete edition of thoſe Lectures; but finding that it was not poſſible for me to give it, with the corrections and ſupplements which would be neceſſary, in a ſatisfying manner, I have long abandoned that idea, and judged it more proper to give an almoſt entirely new work; which I endeavour to do in the preſent publication.

In this work I muſt acknowledge the omiſſion of many articles which have commonly found a place

place in treatiſes on the ſame ſubject. For ſuch omiſſions it is proper for me here to account.

The various nomenclature of the ſeveral ſubſtances treated of I did not think it neceſſary to detail, as it may be readily obtained elſewhere; and particularly I have not attempted to aſcertain the nomenclature of the ancients; both becauſe of the difficulty that attends ſuch a labour, and becauſe the utility of it appears to me very doubtful. In this laſt reſpect, if any one ſhall differ from me, he may find enough of it in other writers; none of whom however, have aſcertained the matter ſo clearly as to prevent the many ill-founded and uſeleſs tranſcripts and quotations from the ancients which ſtill too frequently appear.

In aſcertaining the ſpecies of plants where ſeveral of the ſame genus may be employed, I have purpoſely omitted entering into any critical diſcuſſion which of them is the moſt proper for the purpoſe of medicine. This is often a neceſſary labour; but I thought it enough for me, in the Catalogue which I have prefixed to my Treatiſe,

Treatiſe, to mark the botanical diſtinction of the ſpecies I judged moſt fit to be employed, and of which only I intended to treat in the after parts of my work.

A third, and perhaps more conſiderable, omiſſion which I have to account for is, the not giving any deſcription of the medicine as it is employed, or fit to be employed. This however I have omitted, becauſe I could not do it ſo completely and accurately as the authors to whom I ſhall refer, and whom I ſuppoſe my readers to have in their hands.

That I have not given the chemical analyſis of the ſeveral ſubſtances, is an omiſſion which, if I miſtake not, will require no apology in the preſent age. I have omitted it, becauſe I judge it to be of no uſe in explaining or aſcertaining the virtues of medicines. Any perſon who is of a different opinion may find ſuch analyſis in the accounts of the Academy of Sciences, as they are fully and faithfully given in Mr. GEOFFROY's Treatiſe on the Materia Medica.

Though

Though I may be readily excuſed for omitting the chemical analyſis, I doubt whether I ſhall be ſo eaſily forgiven for frequently omitting the treatment of ſubſtances by the application of different menſtruums, and for not mentioning the quantities of extract that are obtained from each of them. An attention to this is very neceſſary in the pharmaceutic treatment of medicines, and I have frequently pointed out the application of it; but I did not think it proper to increaſe the bulk of my Work by details contained in books to which I refer, and which I wiſh to recommend to all my readers.

From the omiſſions above mentioned, and from others that may be obſerved, it will be readily perceived that the following Work is not offered to the public as complete and ſufficient for every claſs of ſtudents. I do not indeed ſuppoſe that it can be underſtood by perſons who have no previous knowledge of the Materia Medica, or who have never read other books on the ſubject. On the contrary, I wiſh that other books may have been read; though, from what I have ſaid in my hiſtory of the ſeveral writers, it will appear that very few of them are to be read with

advantage

advantage or even with safety, and I find it difficult to point out a selection.

There are however three works which I can venture to recommend, and which I wish to place in the hands of all my readers. These are the Treatise of the Materia Medica by Dr. LEWIS, as now published by Dr. AIKIN; the Treatise of PETRUS JONAS BERGIUS on the Materia Medica, taken from vegetables; and the Apparatus Medicaminum by the learned Professor of Gottingen Jo. ANDREAS MURRAY, Knight of the royal order of Wasa.

In these three books a student will find the omissions I have mentioned above fully and correctly supplied. I wish him also to consult them for another purpose, as he will there find the grounds and occasions of many of the reflections which I have offered in the course of this present Treatise.

Having thus taken notice of the omissions in this publication, and the means by which many of them may be supplied, I am now to mention in general

general what my Treatiſe contains, and what apologies may be neceſſary for its various imperfections.

I have not attempted to give a full account of all that might be ſaid of the ſeveral ſubjects of the Materia Medica. My chief purpoſe is to give the principles upon which thoſe ſubſtances are to be judged of as medicines; to correct the errors of former writers in that reſpect; and to offer ſome new principles and doctrines which to me appear to be neceſſary. Theſe doctrines are given partly in my general introduction to the whole, and partly in the reflections on the general operation of medicines, which I have prefixed to the ſeveral chapters. Theſe diſcuſſions have extended that introduction, as well as ſome other parts of my Work, to a length beyond what might have been expected; but the ſtate both of phyſiology and pathology, for ages paſt, over the greateſt part of Europe, led me to think ſuch diſcuſſions neceſſary. Theſe ſpeculations may often appear doubtful, eſpecially to perſons little exerciſed on this ſubject. I hope however they are well founded; and I offer them with entire deference to the judgment of the public.

In

In aſſigning the virtues of medicines, I have avoided the compilations which have been ſo often injudiciouſly made, by repeating almoſt every thing that had been ſaid before on the ſubject, and commonly without any proper diſtinction of authorities or of probabilities. In this buſineſs I have avoided the fault which GALEN imputed to DIOSCORIDES, and which has been the fault of almoſt every writer on the Materia Medica ſince his time, that is, of aſcribing too many virtues to one and the ſame medicine.

I have, on the contrary, been ſparing in aſſigning virtues; and I have aſſigned thoſe only which are founded upon a nice ſelection of authorities; ſuch as ſeem to me to be conſiſtent with the laws of the animal œconomy; and eſpecially ſuch as I have had confirmed by the experience which an extenſive practice of fifty years has afforded me an opportunity of acquiring.

It may be alleged that I ſeem to be very ſceptical with reſpect to the aſſertions of writers on the Materia Medica; and it may be true that I have been

been perhaps too rigorous in that reſpect: but I am perſuaded that every practitioner of judgment and extenſive experience muſt to a very great degree become ſceptical upon the ſame ſubject. As my doubts, however, have ariſen chiefly from my own experience, I muſt in candour admit, that my experience, like that of every one elſe, may be fallacious, eſpecially in concluding from negative experiments. In all caſes, therefore, where medicines ſhow active parts, I adviſe farther trials to be made, as I may not have employed large enough doſes, nor have adapted them properly to the circumſtances of diſeaſe.

It may be further obſerved, that through the whole of this Work I have omitted a number of articles entirely, and have been brief upon many others to be commonly found in books, while on ſome others I may ſeem to be rather diffuſe. This I acknowledge to be true; but I flatter myſelf that the articles omitted, or paſſed over ſlightly, will be found by moſt judges to be ſuch as do not deſerve more particular notice. I ſhould indeed have omitted more than I have done, had it not been that I judged it neceſſary to correct the aſ-

ſertions

ſertions frequently to be found in the writers on this ſubject.

With reſpect to the articles on which I may perhaps be accuſed of prolixity, they will be found to be upon ſubjects the moſt important, and the moſt frequently employed in practice; ſuch as *Milk*, *Peruvian Bark*, *Opium*, *Camphire*, *Mercury*, and ſeveral others. In conſidering ſuch ſubjects, I wiſhed to aſcertain, with ſome preciſion, their uſe in the great diverſity of diſeaſes, and circumſtances of diſeaſe, in which they have been employed.

Throughout the whole of my Work, to ſupport my reaſonings, and to authenticate the facts adduced, I have quoted the teſtimony of writers whom I myſelf, and I believe the public, eſteem; but it may be complained of, that in doing this, I have not always ſpecified the particular works, or the parts of the works, of the authors I refer to. This indeed is a defect; but the ſupplying it would have required more time and pains than I could have eaſily beſtowed, and I hope it is of little conſequence, as my references are chiefly to well known books, in themſelves provided with Indexes.

Indexes. If however my references to authors only are ſometimes too general, the parts of their works neceſſary to be conſulted will commonly be found in one or other of the three books I have mentioned above, as in them ſimilar references are commonly made, and at the ſame time the parts of their works more particularly pointed out.

In the compoſition and language of this Work there are many faults and imperfections; but the occupations of teaching and practice have not allowed me the time that was neceſſary to have them properly corrected; and if the performance has otherwiſe any merit, I hope theſe imperfections will be excuſed, and eſpecially when it is conſidered that the finiſhing of this Work was neceſſarily delayed till a very advanced period of life, the 77th year of my age.

To the whole of my Work I have ſubjoined a copious Index, which I hope will be found uſeful, particularly in this, that with reſpect to every article of the Materia Medica which may not be completely treated of in one place, or in the one expected

expected from the Contents, what further relates to it in other places may be found by means of the other numbers in the Index; and for a complete knowledge of any ſubject, it will always be proper for my readers to take notice of all the ſeveral parts in which they are mentioned.

In this Index I have inſerted not only the ſubjects of the Materia Medica, but alſo the names of all the writers I have referred to; from which the hiſtory of theſe authors, their merits and defects, and in ſeveral reſpects the progreſs of this part of ſcience, may be learned; circumſtances which may not only gratify the curioſity of many ſtudents, but may afford them, I hope, ſome uſeful inſtruction.

EDINBURGH,
MARCH 1789.

CON-

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THE

HISTORY

OF THE

MATERIA MEDICA,

WITH SOME ACCOUNT OF

THE CHIEF WRITERS UPON IT.

IT is sufficiently probable, that very soon after the first beginnings of human society, some art of physic and some knowledge of remedies arose among men: and, accordingly no country has been discovered, among the people of which, however rude and uncultivated in other respects, an art of physic and the knowledge of a great number of remedies has not been found. The invention of remedies amongst the rudest people may in a great measure be accounted for, from the instincts arising in certain diseases; from the observation of spontaneous cures effected by the powers of the animal œconomy; from accidental errors in the choice of aliments; and even from those random trials, to which pain and uneasiness often lead. But it is not necessary to insist on such speculations at present; and it is still less requisite to repeat here the many frivolous and fabulous accounts that have been given of the invention of particular remedies and medicines.

In whatever manner these may have been first invented, every account we have of the progress of arts amongst men informs us, that the art of physic and the knowledge of remedies have had a share in that progress; and that at all times the urgency of disease, and the knowledge of a few remedies, have engaged men in a constant endeavour to increase the number of them.

In what manner this proceeded in different countries in ancient times is not exactly known. The most ancient account we have of arts is that of their being cultivated in Egypt, but we know few particulars of the state of them there that deserve to be taken notice of; and with respect to medicine in general, it is needless to inquire, as it is known to have been under such regulations as must have been a certain obstacle to its progress and improvement.

The first distinct accounts of the art of physic, as exercised by a particular class of men, are those we have of it in Greece among the priests of Esculapius. It would seem, that for some time these priests, if not the sole, were at least the chief, practitioners of physic in that country; and as the trade was lucrative, it is to be presumed, that these practitioners would endeavour to become knowing in it, and consequently to extend and enlarge their knowledge of remedies. In the temples of Esculapius, therefore, it is probable that a stock of knowledge was preserved, and transmitted down from one set of priests to their successors; and at the same time, these temples afforded a particular means of preserving the knowledge of the materia medica; for we know it to have been then common for persons who had been cured of diseases by the remedies prescribed to them in the temple, to hang up there votive tablets, on which were written some account of their disease, and of the remedies by which it had been relieved.

It is not my business here to trace the progress of physic in Greece; but we may in general observe, that it had its first beginnings in the temples of Esculapius; that these were the first schools of the art; that the first writings upon it were produced there; and that the first clinical practitioners were sent out from these temples. The celebrated Hippocrates was

was one of these; who, after having been instructed in all the knowledge of the school of Cos, and probably also well acquainted with that of Cnidus, became an itinerant and clinical practitioner.

Very few accounts remain of the medicines employed in the temples of Esculapius; and it will readily occur, that the first correct information must be expected and sought for in the most ancient medical writings now remaining, and which are those commonly ascribed to Hippocrates. These writings, however, at least for the purposes of history, afford a precarious and uncertain information; for, as we now have them collected together, they are certainly the works of many different persons, as well as of many different ages; insomuch, that it is impossible, with any clearness, to judge what was the true state of the materia medica in the time of Hippocrates. Besides, if we reflect in how many instances the nomenclature is entirely unknown, and in how many it is very doubtful and uncertain, we shall be satisfied how idle it is in modern writers to quote the authority of Hippocrates for the virtues of almost any medicine. Indeed laying aside our partiality for that celebrated person, there can be no just ground for supposing, that at the period in which he lived, much discernment in the materia medica could have prevailed; and it is hardly necessary to add, that even although the substances named in those writings were known to us with more certainty than they are, yet the distinction of diseases and of their circumstances are so seldom given, that at present we can hardly be guided by them in employing any of the medicines they suggest.

Soon after the age of Hippocrates, ARISTOTLE and THEOPHRASTUS, by laying the foundation of natural history, paved the way for a great improvement in the knowledge of the materia medica: but in ancient times that improvement was never carried far; and consequently, for want of the means of accurately distinguishing substances from one another, this branch of physic remained in much uncertainty and confusion.

For a long time after the age of Hippocrates, we have hardly any of the writings of the eminent physicians of Greece,

at leaſt any of known date, from whence we might learn the progreſs of the materia medica amongſt them. We may preſume, however, that they were conſtantly endeavouring to find out more efficacious medicines; and therefore, upon the whole, increaſing their number. At the ſame time, this ſeems not to have been the caſe with ERASISTRATUS; who is ſaid to have employed few medicines, and thoſe only of the milder kind; and to have declared againſt the compound medicines, which even in thoſe days were ſtudiouſly attempted.

Although Eraſiſtratus, by this conduct, might in ſome meaſure retard, yet there were others who at the ſame time favoured the progreſs of the materia medica, and particularly the equally celebrated anatomiſt HEROPHILUS, who was nearly his cotemporary. This perſon, who held a diſtinguiſhed rank amongſt the phyſicians of Greece, was very much employed in queſt of remedies; and probably gave ſo much encouragement to this ſtudy, as to make his diſciple PHILINUS of Cos devote himſelf entirely to empiriciſm. Philinus is by many ſuppoſed to have been the author or founder of the ſect of profeſſed empirics which appeared immediately after that time: But whether we ſuppoſe Philinus, or with more probability SERAPION of Alexandria, to have been the author of that ſect, certain it is that it aroſe immediately after the time of Herophilus; and this period might be conſidered as one of the moſt remarkable in the hiſtory of phyſic in general, or of the materia medica in particular. It produced, however, no conſiderable revolution in either the one or the other.

What the empirics contributed to the reformation or improvement of phyſic is not now known. HERACLIDES of Tarentum was of the empiric ſect, and is ſaid to have been a perſon of judgment and diligence in the ſtudy of the materia medica; but neither his writings, nor thoſe of any other of the ſame ſect, now remain, nor are there any clear accounts of their improvements now to be found. This ſeems to afford a pretty certain proof that their labours were very fruitleſs: For had they diſcovered any new remedies, or aſcertained more exactly the virtues and proper adminiſtration of thoſe already known, it may be ſafely preſumed, that ſuch improvements

improvements would have been adopted and preſerved by the practitioners of every other ſect.

The ſcheme of the empirics was ſufficiently ſpecious, but the accompliſhment of it was only to be attained in the courſe of many ages: and therefore, while men conſtantly found it incomplete and imperfect, as it is even at the preſent day; practitioners were ever ready to deſert it, and to ſeek for thoſe aids which were promiſed by the other plans of phyſic. Theſe remarks on the ancient empirics, may perhaps enable us to account for the very imperfect ſtate of the materia medica, not only among the ancients, but alſo at all times ſince, in ſo far as it depends upon experience alone.

Although ſuch had been the ſlow progreſs of the materia medica among the phyſicians of Greece, it might be expected to have received ſome improvement when phyſic came to be eſtabliſhed at Rome. This, however, if it took place at all, was to be aſcribed to the Greek phyſicians who came and practiſed there; for amongſt the Romans themſelves the arts had remained long in a very rude and imperfect ſtate. Of this we have a ſtrong evidence in the works of CATO the Cenſor, which yet remain: for in theſe we have an incantation given for the reduction of a luxation; and the braſſica ſeems to have been with Cato an almoſt univerſal remedy. This may ſerve to ſhow, that we are not to inquire after the materia medica among the Romans themſelves, but amongſt the Greek phyſicians who practiſed at Rome.

The firſt of theſe who became of eminence was ASCLEPIADES. He had not been originally devoted to the profeſſion of phyſic, and in entering upon it ſeems to have formed a ſyſtem for himſelf: but if he followed any of the great phyſicians of Greece, it was Eraſiſtratus; who eſtabliſhed a mild practice, employed few medicines, and declared ſtrongly againſt the luxuriancy of compoſition which was then attempted. Like him, Aſclepiades ſeems to have employed a ſmall number of medicines only, and therefore contributed little to the ſtudy of the materia medica.

Although he acquired great authority amongſt the practitioners of Rome, yet there were probably few of theſe who could

could enter into the ſubtleties of his theory; and it was this difficulty which gave occaſion ſoon after to the eſtabliſhment of the ſect called *Methodic*. This plan, however, of this ſect confining them to three general indications only, was by no means ſuited to enlarge the materia medica; which accordingly does not ſeem to have been an object of their cultivation.

Upon this occaſion, it is proper to take notice of the elegant CELSUS, who lived at this period, and was the only native of Rome who ever became diſtinguiſhed in the line of phyſic. Though perhaps not ſtrictly of the profeſſion, he was undoubtedly often engaged in the practice; and in his writings we have many proofs of his diſcernment and good judgment. In his works, we find a great deal more relating to the materia medica than in thoſe of any former author; many medicines being enumerated by him, and a judgment given with reſpect to them. Unfortunately, however, we are under ſuch uncertainty with regard to his nomenclature, that we cannot always be determined in our judgment reſpecting the propriety of his doctrines. He is particularly full in his account of alimentary ſubſtances: ſo that it is with reſpect to theſe we can beſt judge of his opinions; and it is there we find ſome ſingularities which we can hardly approve of. In modern times, much miſchief has been imputed, perhaps not very juſtly, to the *farinacea non fermentata;* and few moderns therefore will approve of Celſus in preferring the *panis ſine fermento* to the *panis fermentatus*.

In many inſtances, his judgment, if we underſtood it well, might be found perhaps to be very good; but in other particulars, we cannot readily admit of it. Thus, in Book II. Chap. XVIII. where he is conſidering the quantity of nouriſhment in different aliments, he has the following aſſertions, which certainly do not diſcover any correct principles on the ſubject.

Omnia legumina, quæque ex frumentis panificia ſunt, generis valentiſſimi eſſe.

In

In media materia——ex quadrupedibus leporem : aves omnes a minimis ad phœnicopterum.

Imbecillimam materiam esse——oleas, cochleas itemque, conchylia.

Ex avibus——valentior, quæ pedibus, quam quæ volatu magis nititur.

Atque eæ aves quoque quæ in aqua degunt leviorem cibum præstant, quam quæ natandi scientiam non habent.

Inter domesticos quadrupedes, leviſſima suilla est.

Omne etiam ferum animal domestico levius est.

These opinions, and several of a like kind, will hardly at present be admitted as just.

With respect to Celsus, it is proper to mention, that before his time there had commenced a particular object of study which very much engaged him, and all the after-writers on the materia medica among the ancients. This was the study of poisons and of their antidotes. What the experience of Mithridates in this matter might amount to, I cannot positively determine; but a great deal of what the ancients have said on the subject of poisons, seems to have been purely imaginary. Indeed there can be no doubt that their their doctrine of antidotes was frivolous and ill-founded; whilst, at the same time, the luxuriancy of their composition shows that they hardly had any discernment with respect to the particulars of the materia medica. Even Celsus himself is not to be exempted from this criticism.

This direction in the study of the materia medica, with respect to poisons and antidotes, I should perhaps have mentioned before, by taking notice of a writer who lived long before Celsus, and some of whose writings still remain. This is NICANDER of Colophon, whose poetical works, *Theriaca* and *De Alexipharmacis*, have been frequently published and commented upon, though it does not appear that they merited any such attention. His skill in natural history appears to have been very mean and incorrect, and has much fable intermixed with it. His antidotes, in so far as we know them, or can judge of them from later experience, are very ill founded; and this, with their being crowded together into one composition, gives much reason to suspect that Nicander's

der's knowledge of the ſeveral particulars of the materia medica was extremely imperfect.

After Celſus, the next writer on the ſubject of the materia medica, to be taken notice of, is SCRIBONIUS LARGUS, who treats profeſſedly of the compoſition of medicines. With regard to him, we muſt give preciſely the ſame judgment as with reſpect to Celſus. There occur in him the ſame uncertain and doubtful nomenclature; the ſame abundance of external remedies; and, reſpecting the internal, the ſame inaccuracy in diſtinguiſhing diſeaſes, as well as the like imperfection in marking the cauſes and circumſtances of thoſe to which medicines ſhould be adapted. Together with all this, we find the ſame ſtudy of poiſons and antidotes, and the ſame injudicious luxuriancy of compoſition, which has diſgraced the preſcriptions of phyſicians ever ſince.

From this writer we perceive, that the ſame ungenerous ſelfiſhneſs of keeping medicines ſecret prevailed in ancient times, as it has often done ſince, to the reproach of the profeſſion: and from the hiſtory of ANTONIUS PACHIUS we find, that then, as ſince, theſe ſecret medicines were in a quackiſh manner held forth as almoſt univerſal remedies.

In Scribonius there occur alſo many ſuperſtitious follies with reſpect to remidies, which detract very much from the good ſenſe and philoſophy of thoſe days; and ſuch indeed occur not only in him, but in Pliny, Galen, and all the other writers of ancient times.

The luxuriancy of compoſition would ſeem to have been at its height about this time in the hands of ANDROMACHUS ſenior; and it affords a certain proof of the very ſlow progreſs of diſcernment in the buſineſs of the materia medica, that even to the preſent day the compoſitions of Andromachus have retained a place in our Diſpenſatories. Even the London College, who, in their Diſpenſatory of the year 1746, had ſhewn ſo much diſcernment and judgment in correcting the luxuriancy of compoſition, ſtill retained the Theriaca Andromachi in its ancient form; which though perhaps contrary to the judgment of ſome of the members,

yet

yet discovered how much many of them were still governed merely by the power of habit.

After mentioning the time of Andromachus, we are arrived at a remarkable period in the history of the materia medica, which is that of the time of the much esteemed DIOSCORIDES. This author, who probably lived in the time of the Emperor Vespasian, is, of those now remaining who wrote professedly on the subject, the most ancient. He is commended by Galen as one of the best and most complete writers on the materia medica; and he is remarkable for having been considered ever since as the principal and classic writer upon it. He has accordingly been transcribed and repeated by almost every writer since; but that this has been owing to the real value of his writings, it is not easy to perceive.

Dioscorides has given us a large list of medicines, with some opinion respecting each; but as his descriptions are very imperfect, and the nomenclature has been since very much changed, we are often uncertain what the substances are which he treats of, and therefore cannot always judge how far the virtues ascribed to them are well founded. In several respects, however, his judgment in general may be suspected. When we find him so often ascribing to substances the power of resisting the poison of serpents and other animals, and even of curing the bite of mad dogs; when he gives us many medicines for dissolving the stone in the bladder, for consuming the spleen; for moderating the venereal appetite in males, and for preventing conception in females; for promoting the birth of children, and expelling the secundines and dead fœtus, and for making children black-eyed; the ascribing these, and other improbable virtues, gives me a mean opinion of the judgment of Dioscorides, or, if you will, of the physicians of his time, in this business. Linnæus, by the character of *Experta*, which in his list of writers he annexes to the writings of Dioscorides, seems to consider these writings as the fruits of experience; but I cannot believe that Dioscorides had consulted experience when he attributed to so many medicines the power of promoting urine, and of exciting the menses. Such powers may truly exist in many medicines; but it may be truly asserted, that they

they are not to be found in one of a hundred to which Dioſcorides has aſcribed them.

In many parts of his writings, where he treats of ſubſtances which we may be ſuppoſed acquainted with, the juſtneſs of his ſkill in aſſigning virtues is very doubtful; and to me he appears to be not only miſtaken, but ſometimes inconſiſtent with what he has ſaid in another place. In many inſtances he is looſe and undiſtinguiſhing with reſpect to the circumſtances of diſeaſes to which medicines are to be applied; and often pointing them out only as being uſeful in general, as in *Vitiis Renum*, *Pulmonum*, *Vulvæ*, &c.: but ſuch opinions are generally uſeleſs, and may be often miſleading and pernicious.

From theſe conſiderations, I cannot join in that ſuperſtitious regard which has been ſo generally paid to Dioſcorides; and muſt deem it to have been rather unfortunate for the ſtudy of the materia medica in modern times. It has certainly been unlucky that more labour has been beſtowed to aſcertain the medicines pointed out by him, about which we are doubtful, than in aſcertaining the virtues of thoſe ſubſtances we are acquainted with.

Nearly at the ſame time with Dioſcorides, or ſoon after, lived the elder PLINY, another copious writer on the materia medica. This truly learned man was, however, as upon moſt other ſubjects, ſo in particular on that of the materia medica, a mere and often an injudicious compiler. He has frequently repeated after Dioſcorides, or the authors whom Dioſcorides had himſelf borrowed from; although, being hardly in any caſe a practitioner in phyſic, he was perhaps leſs fit than Dioſcorides for making a compilation on this ſubject. With reſpect to his writings on the materia medica, we can only ſay, that every difficulty and every fault that occurs in the writings of Dioſcorides occurs alſo in thoſe of Pliny.

In juſtice to the latter it muſt, however, be acknowledged, that he diſcovered more judgment than his cotemporaries, in condemning the very luxuriant compoſitions which at that time were ſo much affected. After mentioning the number of ingredients in Mithridatium Antidoton, and taking

king notice of the ſmall proportion of ſome of them, he adds, " Quo deorum perfidiam iſtam monſtrante ? Homi-" num enim ſubtilitas tanta eſſe non potuit. Oſtentatio artis " et portentoſa ſcientiæ venditatio manifeſta eſt."

Soon after Pliny appeared the celebrated GALEN, from whoſe extenſive knowledge and erudition, and eſpecially from his large experience in the practice of phyſic, we might have expected a great improvement of the materia medica ; but we are much diſappointed, as we find nothing in his writings ſufficient to excuſe the inſolence with which he treats his predeceſſors, nor to ſupport the vanity he diſcovers with regard to his own performances.

On the ſubject of the materia medica, he attempted what was very much a new ſyſtem. He maintained, that the faculty or power of medicines depends chiefly upon their general qualities of heat and cold, moiſture and dryneſs. He obſerved, that the writers before him had ſuppoſed the ſame ; but that their doctrines could not be uſefully applied, becauſe they had not obſerved the various combination of theſe qualities, and much leſs the various degrees in which the quality might be in every particular ſubſtance. All this Galen endeavoured to ſupply : and for that purpoſe he ſuppoſed that every quality might be in four different degrees, and that its power would be in proportion to theſe ; and when he treats of particulars, it is chiefly to tell us what are its general qualities, and the different degrees of theſe in each. His judgment of theſe is not taken exactly from the ſenſe of taſte and odour which every ſubject affords, or from any other meaſure which could then be applied : Even the general qualities, and more ſo their ſeveral degrees, are hypothetically and much at random aſſigned. Though the whole of the doctrine were better founded, I need not ſay that it would not apply to the aſcertaining the virtues of medicines ; and Galen himſelf takes notice, that certain virtues do not depend upon the general qualities, but upon ſomewhat not eaſily aſcertained in the whole of the ſubſtance.

Though the doctrine in general was falſe and inapplicable, yet it was received and implicitly followed by all the phyſicians of Greece who came after Galen ; and indeed by all

all the phyſicians of Aſia, Africa, and Europe, for at leaſt 1500 years after his time.

To judge further of the ſtate of the materia medica at the time of Galen, we muſt obſerve, that in treating of particular ſubſtances, beſides giving us the ſtate of the cardinal qualities in each, he gives us ſometimes particular virtues which might not ſeem to ariſe from the general qualities: but in this he is not more correct, or, if I might be allowed the expreſſion, not more wiſe than Dioſcorides. The reſiſting the poiſon of ſerpents, and even of mad dogs; the diſſolving the ſtone in the bladder; the conſuming the ſpleen; the expelling the ſecundines and dead fœtus, and ſome other equally improbable virtues, he aſcribes to various ſubſtances. He juſtly finds fault with Dioſcorides for attributing too many virtues to the ſame ſubſtance; but he is not himſelf every where free from the ſame fault. It might have been expected that he would frequently have appealed to his own experience; and ſometimes, though very rarely, he does ſo: Although he had done it more frequently, there are paſſages in which we cannot admire the accuracy of his diſcernment.

In repeating after Dioſcorides the virtues of the damaſonium, he adds, "Sed nos ea quidem experti non ſumus: "quod autem conſtitutos in renibus calculos, aqua in qua "decocta fuerat pota comminuat, id certe experti ſumus." On the lapis Judaicus he has this remarkable inſtance of his experience: "Ad veſicæ lapides———in quibus nos ex- "perti ſumus, proficit nihil, quod ad lapides veſicæ perti- "net; verum ad eos qui in renibus hærent, efficax eſt." Other examples may be given of Galen's falſe experience: but it will be ſufficient to remark, that there can be no ſtronger proof of this, than when a perſon imputes effects to ſubſtances abſolutely inert with reſpect to the human body; and ſuch are the various ſuperſtitious remedies, ſympathetic cures, and moſt of the amulets that have been employed as remedies. Galen gives us a remarkable inſtance on the ſubject of pæony. He is probably the author of the anodyne necklace, ſo long famous among the great and little vulgar of England. If he had taken his opinion of the pæony from the teſtimony of others, or even from the theory he has here laid down in favours of its poſſible virtue,

tue, I ſhould have been ready to excuſe him; but when he gives it as a matter of his own particular experience, I muſt ſuſpect either his truth or his diſcernment. Here is his account, as tranſlated by Charterius.—" Eo propter " haud deſperaverim, eam (quod merito creditum eſt), ex " collo pueris ſuſpenſam comitialem morbum ſanare. Equi- " dem vidi puellum quandoque octo totis menſibus morbo " comitiali liberum, ex quo hanc radicem geſtavit; ac " poſtea forte fortuna quum, quod a collo ſuſpenſum erat, " decidiſſet, protinus denuo convulſione correptum; rurſuſ- " que ſuſpenſo in locum illius alio, inculpate poſtea egiſſe. " Porro, viſum eſt mihi ſatius eſſe rurſum id collo detra- " here, certioris experientiæ gratia. Id quum feciſſem, ac " puer iterum eſſet convulſus, magna recentis radicis parte " ex collo ejus ſuſpendimus; ac deinceps prorſus ſanus effec- " tus eſt puer, nec poſtea convulſus eſt." He adds his explanation of this event, which I need not conſider, as at any rate it will hardly apply to the fact that he gives in the ſame paragraph, of ſome threads tied about the neck of a viper ſo as to ſuffocate it, and afterwards tied about a patient's neck and curing all ſorts of tumours ariſing in it.

Beſides his Treatiſe of Simple Medicines, Galen has given us two other works that may throw ſome light on the ſtate of the materia medica in his hands. One of theſe works is his Treatiſe de Compoſitione Medicamentorum ſecundum Locos; that is, as they are adapted to the ſeveral parts of the body. In this we have a large collection of compound medicines; and the largeneſs of the collection which appears in the number of compoſitions for the ſame diſeaſe, and the number of ingredients in moſt of the compoſitions, ſhow ſufficiently to me the great want of diſcernment in the nature of medicines. This want of diſcernment appears fully enough in Galen himſelf: for although he is not indeed without giving us his own judgment; yet certainly, from his own obſervation or experience, he had not arrived at any nice judgment, when the work I have mentioned is almoſt entirely a compilation from Andromachus, Aſclepiades Pharmacion, Archigenes, and a number of other writers who had gone before him.

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We have thus ſaid enough of the materia medica of Galen, and perhaps more than it deſerved: but as his ſyſtem continued to be implicitly followed ſo long after his own time, it ſeemed proper to ſhow what was, almoſt entirely, the ſtate of the materia medica till the middle of the 17th century; and as there are ſtill in late writings many remains of what was derived from Galen, I was willing to ſhow upon how bad a foundation many of theſe writings have been compiled, and particularly to mark out how much a veneration for antiquity has retarded the progreſs of ſcience in modern times.

After Galen, no change in the plan of the materia medica was made by the phyſicians of Greece; and although in AETIUS, ORIBASIUS, and ſome others, there are large compilations on the ſubject, yet they are nothing more than compilations, conſpicuous for the ſame imperfections which are ſo remarkable in the writings of Galen himſelf.

When the knowledge of phyſic had very much declined among the Greeks, it happened to be transferred to the Saracens, whom we commonly ſpeak of under the name of Arabians; and theſe for ſome time were almoſt the only perſons in Aſia and Africa who cultivated ſcience. Amongſt them, in a climate which had not been before examined, ſeveral of its productions, learned perhaps from the natural phyſic of the people, were added to the materia medica of the Greeks, and probably with ſome improvement; as in place of the more violent and draſtic purgatives of the Greeks, the Arabians ſubſtituted ſeveral of a milder kind. In no inſtance, however, that I can perceive, did they diſcover any medicines of peculiar power; and as they had derived almoſt the whole of their knowledge of phyſic from Greece, ſo in every part of it they had adopted very entirely the ſyſtem of Galen. In particular, it does not appear that they made any improvements, either in the general plan of the materia medica, or in aſcertaining the virtues of particular medicines.

In one inſtance, however, they laid the foundation of a very conſiderable change which afterwards more fully took place in our ſubject; for it was certainly amongſt them, that, for the purpoſe of medicine, ſubſtances were firſt operated

operated upon, and were prepared by the peculiar operations of chemiſtry.

In the ſame ſtate that phyſic was amongſt the Arabians, it was, after a long age of ignorance, revived in the weſtern parts of Europe, by ſchools that were eſtabliſhed there by the Arabians or their diſciples. It was revived, however, among men not only in the loweſt condition with reſpect to ſcience, but of no induſtry or activity in the purſuits of it; and from whom, therefore, nothing new was to be expected. Accordingly, nothing new appeared among the phyſicians of Europe, while they continued to be the ſervile followers of the Arabians.

At length, about the middle of the 15th century, the taking of Conſtantinople by the Turks having forced many learned Greeks to take refuge in Italy, this event, together with ſome other circumſtances, gave riſe to the ſtudy of the language, and thereby to the literature of the Greeks in the weſtern parts of Europe.

The phyſicians becoming thus acquainted with the writings of the ancient Greeks, ſoon perceived that theſe were the chief ſources from whence the Arabians had drawn their knowledge, and very properly applied themſelves to the ſtudy of the original writers. From thence having obſerved that in ſome particulars the Arabians had deviated from the practice of the Greeks, they ſet themſelves to criticiſe the Arabians, and to correct the errors derived from them, which then prevailed. This produced ſome controverſies between thoſe who followed the Greeks and thoſe who ſtill tenaciouſly adhered to their Arabian maſters; and theſe controverſies continued for ſome part of the 16th century. By degrees, however, the Greek party prevailed, and the Arabians came to be generally neglected; though it is curious to be obſerved, that ſo late as the middle of the 17th century, Rolfinck, a profeſſor of Jena, read lectures upon the Arabian Rhazes, and Plempius of Leyden publiſhed and commented upon a work of Avicenna.

Upon this occaſion, I could not avoid touching this part of the hiſtory of phyſic, though it has little relation to our ſubject; which, during the period mentioned, made very

very little progreſs among perſons who were almoſt entirely the bigotted followers of the ancients. Whether they followed the Greeks or the Arabians, it was chiefly, and almoſt only, the ſyſtem of Galen which both parties adopted; and the materia medica, with a few additions by the Arabians, continued to be much the ſame as it had been delivered by Galen himſelf; being every where explained by the cardinal qualities and their different degrees, with very little reference to any thing acquired by experience.

The ſyſtem of Galen, almoſt alone, had now ſubſiſted in the ſchools of phyſic, from his own time in the 2d century after Chriſt till the 16th was pretty far advanced; and it is well known to have happened at all times, that of the perſons who apply to ſcience, the greateſt part implicitly receive the doctrines delivered by their maſters; which having once imbibed, adhere to them with a degree of bigotry that oppoſes every attempt towards innovation and improvement. Such was the condition of the ſtate of phyſic with the followers of Galen at the beginning of the 16th century, that it required ſome violent efforts to ſhake off the torpor and vanquiſh the bigotry of the Galenic ſchool; and although the reformation which happened was not conducted with the diſcretion that might have been wiſhed, yet it was fortunate for ſcience that ſuch a revolution took place at this time.

It has been already remarked, that chemiſtry appeared firſt among the Arabians; and it is probable that ſome of their firſt operations were upon metallic ſubſtances. Accordingly, we find a preparation of mercury mentioned in Rhazes; and it is pretty certain, that in the immediately following ages the chemiſts were buſy in their operations upon antimony: for the Currus Triumphalis Antimonii, publiſhed under the name of Baſil Valentine, and ſuppoſed to have been written about the end of the 15th or beginning of the 16th century, mentions a great variety of theſe preparations.

Although the progreſs of this buſineſs cannot be preciſely traced, yet there is good ground to believe, that the chemiſts very early directed the employment of their art to the preparation of medicines; and, agreeable to the fanatical ſpirit which

which ſo generally prevailed among them, they conceived the idea of preparing an univerſal medicine, and one which ſhould protract life to a thouſand years.

How they ſucceeded in theſe viſionary ſchemes need not now be told: but it is certain that many of them became empirical practitioners of phyſic; and it is probable that the medicines they employed were violent, and were therefore avoided by the timid and inert regulars of thoſe days. One of the latter, Gordonius, author of the Lilium Medicinæ, gives us this account of the opinion which then prevailed with regard to chemical medicines: "Quia (ſays he) modus chemicus in multis utilis eſt, ſed in aliis eſt triſtabilis quod in ejus via infinitiſſimi perierunt."

In this ſituation matters ſtood at the beginning of the 16th century, when the famous PARACELSUS appeared. He does not appear to have ſtudied in any of the eſtabliſhed ſchools of thoſe days; but, determined to follow his father's profeſſion, which was that of phyſic, he ſeems to have travelled about in queſt of remedies amongſt all ſorts of people, and particularly among the chemical practitioners of thoſe times. From theſe he learned the uſe of mercury and antimony; and from ſome hardy empirics, the uſe of opium; at leaſt, a more free uſe of this than was then common. By employing theſe remedies, he was enabled to cure many diſeaſes which had baffled the inert remedies of the Galeniſts; and being of a bold and boaſtful diſpoſition, he made the moſt of theſe accidents; while at the ſame time, the partiality of mankind to empiriciſm ſoon contributed to give him great fame.

He was ſo far more fortunate than any former chemical practitioner had been in acquiring a general reputation, that he was called to a profeſſor's chair in the Univerſity of Baſil. In this ſituation he found it neceſſary to become ſyſtematic; and making uſe of ſuch theories as he could derive from his predeceſſors in chemiſtry, upon theſe grounds attempted a ſyſtem of phyſic, blended with moſt extravagant and viſionary doctrines, ſupported and covered by a great deal of new and meaningleſs jargon of his own. His lectures were chiefly employed in recommending his own chemical remedies, and declaiming in the moſt outrageous manner againſt the eſta-

bliſhed ſchools of phyſic. He did not, however, continue long in this employment; for his boiſterous temper engaged him in meaſures which ſoon obliged him to leave both the univerſity and city of Baſil.

His hiſtory after this is pretty well known; and it is only requiſite to ſay, that he gave occaſion to the forming a ſect of phyſicians who appeared in oppoſition to the eſtabliſhed ſchools, then entirely followers of Galen. The chemiſts employed a ſet of remedies which the Galeniſts very violently oppoſed; and for a hundred years afterwards, the phyſicians of Europe were divided into the two ſects of Chemiſts and of Galeniſts. The chemiſts were men of little erudition and of mean parts, and delivered theories full of jargon and nonſenſe; but againſt all this the efficacy of their medicines ſupported them, and increaſed more and more their credit with the public. Their encroachments on the trade were felt by the Galeniſts, and produced a violent oppoſition, ſupported by all that bigotry which is common to ſchools long eſtabliſhed, and of which the Galeniſts ſtill held the entire poſſeſſion. Upon this occaſion the Galeniſts were imprudent: for they aſſailed their antagoniſts, not in their weak, but in their ſtrongeſt quarter; and attacked, with intemperate violence, all thoſe powerful and efficacious remedies by which the authority of the chemiſts was ſupported. This happened particularly in France, where the Galeniſts called in the aid of the ſecular arm, and employed it to oppreſs their adverſaries.

It was in Germany that the chemical practitioners eſpecially prevailed; and there was hardly a ſovereign court in that country in which an alchymiſt and a chemical practitioner of phyſic were not retained. Even the Galenical practitioners there came ſoon to employ the remedies of the chemiſts; and Sennertus, one of the moſt eminent Galeniſts of Germany, endeavoured to reconcile the two oppoſite parties.

Linacre and Kay, the reſtorers of phyſic in England, were zealous Galeniſts; but as no regular ſchool of phyſic was ever well eſtabliſhed there, the perſons deſtined to phyſic chiefly reſorted to the ſchools of Italy and France, where they generally became Galeniſts: And although the London college ſhowed ſome diſpoſition to oppreſs the chemical practitioners in the perſon of *Francis Antony*, it was more under the pretence of checking quackery than of oppoſing chemiſtry.

Very

Very early in the 17th century, Sir THEODORE MAYERNE, who as a chemical phyſician had been much oppoſed and oppreſſed by the Galeniſts of France, was called over into England, where he was appointed firſt phyſician to the king, and continued to hold that office for more than thirty years after. His theory and his preſcriptions were very like thoſe of the Galeniſts; but he was a great favourer of chemical medicines, and particularly of antimony; the medicine with regard to which the two ſects were moſt eſpecially divided. It does not, however, appear, that upon this account he met with any oppoſition from the phyſicians of England; and indeed, on the contrary, we find him becoming a member of, and acquiring great authority in, the London college. It is probable that his great credit put an end, in England, to all diſtinctions between the Galenic and chemical practitioners; and as in the year 1666, the faculty of Paris reſcinded their arret diſcharging the uſe of antimony, there was thereafter hardly any where a diſtinction to be found between Galeniſts and chemiſts.

This detail of the progreſs of chemical phyſic, and of the conflict which happened between the chemiſts and the Galeniſts, ſeemed neceſſary in order to explain the ſtate of the materia medica in modern times; and it merits particular attention, that in the courſe of the 16th century, the introduction of the more frequent uſe of chemical medicines, and of the more frequent application of chemiſtry to their preparation, produced a very great change in the ſtate of the materia medica. Foſſil medicines, and ſome of them entirely unknown to the ancients, came now to form a much greater part of it than formerly; and not only thoſe of the metallic, but many of the ſaline kind, little known before, were now introduced. The Galeniſts had in ſome degree employed diſtilled waters and extracts: but now the chemiſts ſubjected a much greater variety of ſubſtances to thoſe operations; and hence diſtilled waters, eſſential oils, quinteſſences, and extracts, came, with thoſe who admitted of chemical remedies at all, to conſtitute almoſt the whole of the materia medica. Many of theſe preparations were indeed injudicious, and the employment of them was without diſcernment; but the virtues aſcribed to them entered into the writings on the materia medica, and have been frequently repeated ſince. Theſe pretended virtues are often aſſerted as from experience; but

among the many deceivers in the buſineſs of the materia medica, none have been more frequently ſuch than the chemiſts.

Whilſt chemiſtry was thus employed to modify the materia medica, it was accompanied by every ſpecies of fanaticiſm; by the doctrines of aſtral influences, animal magnetiſm; by pretenſions to alchemy, to panaceas, and to medicines capable of prolonging life. All theſe had ſome influence on the materia medica; but none more very generally received than the doctrine of ſignatures; and which has had its influence even till very lately. The Decoctum ad Ictericos of the Edinburgh Diſpenſatory 1756, never had any other foundation than this doctrine of ſignatures in favour of the Curcuma and Chelidonium Majus.

The doctrines of Chemiſtry, though attended with ſo many abſurdities, were, however, the moſt promiſing towards explaining that quality in medicines upon which their virtues depended; and accordingly have ever ſince been more or leſs applied to that purpoſe. After the vague and unmeaning theories and jargon which the chemiſts on their firſt appearance introduced, the firſt appearance of ſyſtem was that of the doctrine of acid and alkali, which continued to have a great ſhare in medical doctrines for a long time after; ſo that, according to the fancy of the phyſician, the cauſes of almoſt all diſeaſes were referred to an acid or an alkali prevailing in the human body; and remedies accordingly were arranged as they poſſeſſed the one or the other principle. Thus we find TOURNEFORT trying every vegetable juice by experiment, to diſcover in it the mark of acid or alkali: But it was ſoon found that this ſyſtem was too general to admit of its being applied to any extent, and that it was neceſſary to enquire more particularly into the conſtituent parts of medicinal ſubſtances. At the ſame time, this was ſtill expected from chemiſtry; and accordingly the Academy of Sciences engaged ſome of their members to make the *Chemical Analyſis*, as it is called, of almoſt every medicinal ſubſtance; and which, I believe, was executed with great accuracy. It was, however, ſoon perceived, that ſubſtances of very different, and even of oppoſite qualities in medicine, gave out, in a chemical analyſis, very much the ſame products; and it was therefore alſo perceived, that theſe analyſes hardly threw any light

light upon the medicinal virtues of the ſubſtances treated in that manner.

It was about this time, that certain phyſicians, who preſumed to judge of the conſtituent parts of medicines, partly from their chemical analyſis, partly from their ſenſible qualities, formed plans of the materia medica. Such was that of HERMAN the profeſſor of materia medica at Leyden, in his little work intitled *Lapis Materiæ Medicæ Lydius:* but to any perſon conſidering this work, it will be obvious, that the author has often determined the conſtituent parts at random, and that his doctrine is neither clear, correct, nor applicable; though it has ſtill remained long amongſt the doctrines of the materia medica.

It has almoſt at all times been ſuppoſed, that the virtues of medicines were ſo ſtrictly connected with their ſenſible qualities of taſte and ſmell, that from thence the knowledge of their medical virtues were to be acquired. Accordingly, theſe ſenſible qualities have been generally taken notice of by the writers on the ſubject; and Sir JOHN FLOYER, as well as others, has thereupon attempted to build an entire ſyſtem; but with little ſucceſs, as we ſhall have occaſion to ſhew hereafter.

After all the ſchemes at any time formed for inveſtigating the virtues of medicines, it will be readily acknowledged, that the concluſions formed from any of them can hardly be truſted till they are confirmed by experience; and though this alſo may often prove fallacious, it is much to be regretted that ſo little pains have been taken by our writers to obtain this teſt in favour of the virtues they aſcribed to medicines. Some attempts, indeed, in this way have been made; and the ſagacity and judgment of CONRAD GESNER, had he been at leiſure to proſecute this inquiry, would have been of more ſervice than the multitude of compilations which have been made. What has rendered the alleged reſults of experience leſs uſeful ſhall be ſaid in another place; but in the mean time, it will be proper to take notice of two attempts which were made in England to conſult experience with reſpect to the materia medica.

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The firſt was by Mr. JOHN RAY, who in attempting to give a complete hiſtory of plants, thought it incumbent on him, as many other botaniſts have idly ſuppoſed it, proper for them to enumerate the virtues of the plants uſed in medicine. In this, however, Mr. Ray has chiefly copied from preceding writers, and particularly from John Bauhin and Schroeder; but wiſely perceiving that the proper foundation was experience, he applied to many of his friends engaged in the practice of phyſic; and from ſome of theſe has given us a number of experiments, which have been ſince tranſcribed by Geoffroy and other writers. Either, however, from the fallacy of experience, or from the raſhneſs of his friends in drawing concluſions from it, the value of Mr. Ray's reports is not ſo great as might have been expected.

About the ſame time Mr. BOYLE endeavoured to engage the practitioners of phyſic in the ſtudy of ſpecific medicines; that is, of medicines whoſe virtues are learned only from experience. There will be occaſion hereafter to conſider not only in what circumſtances the doctrine of ſpecifics may be admitted, but alſo how it is to be properly managed; and at preſent it is only neceſſary to take notice of its effects on the ſtate of the materia medica at the end of the laſt century. Mr. Boyle, from the great benevolence of his diſpoſition, was very diligent in enquiring after ſpecific and experienced remedies; and has given us a collection of remedies which he ſuppoſed to be of this kind. From his want, however, of diſcernment with reſpect to the nature and ſtate of diſeaſes; from his not being ſufficiently aware of the fallacy of experience, and perhaps from his being little on his guard againſt falſe information; his collection has contributed very little towards the improvement of the knowledge of the materia medica.

Soon after this, when it was perceived that the chemical analyſis by the power of fire contributed nothing towards diſcovering the conſtituent parts of ſubſtances in which their medicinal virtues were eſpecially to be found, it came to be very juſtly conceived, that a more ſimple and leſs violent means of reſolution might better anſwer the purpoſe. Phyſicians and chemiſts, therefore, ſet about treating many vegetable ſubſtances, either by infuſion and decoction in water, or by infuſion and ſpirituous menſtruums, and obtaining extracts

tracts in consequence of these operations; and such labours still continue to be employed with great diligence. In many cases they have been useful in ascertaining whether the medicinal virtues were best extracted by watery or by spirituous menstruums; whether the virtues resided in a volatile or in a fixed substance; and whether they were chiefly in the parts that could be separated by these operations, or only in the entire and undecomposed substance of the vegetable matter. By these labours the doctrines of the materia medica have been often corrected, and we have been thereby frequently taught not only to distinguish the different degrees of the same quality in different bodies, but they have been particularly useful in directing the most proper pharmaceutical treatment of medicines, and have sometimes afforded an analogy for judging of the virtues of untried substances. With respect to their effect in ascertaining the virtues of medicines, I think they have done very little: for whether the medicinal virtue be found to reside in a volatile or a fixed, in a gummy or a resinous part, it will still require and depend upon experience to determine what that virtue is.

We are now arrived at a period when a number of different theories, successively or together, prevailed in the schools of physic; and which, according to the nature of their different systems, variously affected the state of the materia medica. Thus the Stahlians, in following the general principle of their system, always mysterious, have introduced archeal remedies, and many of a superstitious and inert kind; while at the same time, trusting to the *Autocrateia*, they have opposed and rejected some medicines of the most powerful nature.

On the other hand, the mechanical physicians, by introducing the Corpuscularian philosophy; that is, the notion of the small parts of bodies acting upon one another, by their figure, size, and density, have in that manner endeavoured to explain the operation of medicines upon the fluids and solids of the human body; and have thereby introduced many false opinions concerning their virtues. It was the Cartesian physicians who first introduced this doctrine; but it was especially Dr. Boerhaave, who, by adopting it, contributed to extend it to the whole of medical writers. Even at this day it has not yet passed away; for I observe that a late author, Mr. Navier, and a living writer, Mr. Fourcroy, have

continued

continued to explain the operation of mercury by its ſpecific gravity.

As it has happened, that ever ſince the introduction of chemical reaſoning, phyſicians have generally conſidered the cauſe of diſeaſes to be depending upon the ſtate of the fluids, ſo they have conſidered the operation of medicines chiefly as changing that ſtate; and the theory ſtill enters to a conſiderable extent into the doctrines of the materia medica. I judge this to be very improper, while the ſtate of the moving powers, and of the various means of changing that, are as yet but little attended to. With reſpect to this, Dr. Hoffman admitted the general principle, and has this expreſſion: "Demum omnia quoque eximiæ virtutis medicamenta, non "tam in partes fluidas, earum craſin ac intemperiem corrigendo, quam potius in ſolidas, et nervoſas, earundem "motus alterando ac moderando, ſuam edunt operationem: "de quibus tamen omnibus, in vulgari uſque eo recepta "morborum doctrina, altum eſt ſilentium." Notwithſtanding this, he himſelf, in treating of particular medicines, has for the moſt part employed the Corpuſcularian philoſophy, or a very ill defined chemiſtry, to explain the operation of medicines upon the fluids.

Another circumſtance ſtill affecting and injuring the writings on the materia medica, is that of referring the operation of medicines to certain general indications; moſt of which have ariſen from defects both of phyſiology and pathology, and are neither ſufficiently explained nor well underſtood. They are for the moſt part of too general and complicated a kind, and ought to be reduced at leaſt to more ſimple operations; and which, if it could be done with clearneſs, would not only prove one of the moſt uſeful methods of delivering the materia medica, but would almoſt entirely deſtroy the doctrine of ſpecifics, which muſt otherwiſe continue upon the moſt myſterious and uncertain foundation. At preſent, many of the general indications to which the virtue of medicines are referred, are abſolutely ſuppoſititious and falſe.

From having thus pointed out the many falſe ſources from which opinions concerning the virtues of medicines have been derived, it will be evident that the writings upon the materia medica, being almoſt always compilations, muſt be full of miſtakes and frivolous matters.

Whenever

Whenever an author does not ſpeak from his own knowledge and experience, but only informs us that a medicine has been ſaid by former writers to have certain effects, or has been commended as curing certain diſeaſes, he is merely a compiler, and upon a very uncertain foundation. It is impoſſible indeed for any man to treat of every article of the materia medica from his own experience; but ſurely, when it becomes neceſſary for him to quote the experience of others, he muſt be allowed to do ſo, but it muſt be with great ſkill and diſcretion in chooſing his authorities; which, however, has been ſeldom done; and the neglect of it has filled our writings with a great deal of falſe experience.

Notwithſtanding what I have now inſinuated with reſpect to the imperfections to be found in the writers on the materia medica, it muſt be owned, that in modern times, more eſpecially in the courſe of the preſent century, and even lately, the materia medica has received much correction and improvement.

The progreſs of philoſophy has corrected many ſuperſtitious follies that were formerly intermixed with the doctrines of the materia medica. Chemiſtry has given us many new medicines, entirely unknown in ancient times; and this ſcience, in its progreſs, has not only gradually corrected its own errors, but has taught us to reject many inert medicines which formerly made a part of the materia medica. It has taught us a greater accuracy in preparing all its peculiar productions, and to lay aſide many of thoſe operations with which it had amuſed the phyſician, and had impoſed much uſeleſs labour upon the apothecary. In particular, it has inſtructed us how to make the combinations of medicines with greater correctneſs and propriety; and in all theſe reſpects has rendered the whole of the pharmaceutic treatment of medicines more ſimple and accurate than it was before.

Chemiſtry has thus greatly improved the ſtate of the materia medica, and has led phyſicians to a diſcernment that ſhould reject that luxuriancy of compoſition formerly ſo prevalent; and which, even at preſent, in moſt parts of Europe, is far from being ſufficiently corrected. The reformation in this reſpect has not yet taken place to any remarkable degree, excepting

excepting in the northern countries of Europe, in Britain, Sweden, Denmark, and Ruſſia. And if we look into the laſt edition of the Wirtemberg Diſpenſatory, which is of much authority in Germany, or into the Pharmacopœia Generalis lately publiſhed by Spielman, we ſhall perceive that a great luxuriancy of compoſition ſtill prevails in Germany; and if we look into the Codex Medicamentorum Pariſienſis, we ſhall be ſurpriſed at the many injudicious compoſitions, conſiſting of numerous and inert ingredients, which ſtill prevail in the enlightened kingdom of France.

Having thus finiſhed what it ſeemed proper to ſay of the general hiſtory of the materia medica, it may be expected, and will be proper, to give ſome particular account of the principal authors who have treated this ſubject. With reſpect to ancient authors, it does not ſeem neceſſary to ſay more than I have done above; and therefore what is farther to be offered ſhall relate only to the chief writers in modern times.

The writers of the 16th century, ſuch as TRAGUS and TABERNÆMONTANUS, though frequently quoted ſince, do not deſerve much attention, as they are merely compilers from the ancients, tranſcribing all their imperfections, and adding ſome miſtakes of their own. If they offer ſome new facts, they are on a doubtful foundation, and often manifeſtly miſtaken. As a ſpecimen of the writings of Tragus, let us take the following, which I am aſhamed to find quoted and repeated by the ingenious Mr. Geoffroy. On the ſubject of the Polytrichum, Mr. Geoffroy has theſe words: "Tragus "aſſerit illud vel ſolum vel cum Ruta muraria, vino aut hy-"dromelite decoctum et per aliquot dies ex ordine potum, "obſtructiones jecinoris ſolvere, morbum regium expellere, "pulmonis vitia purgare, ſpirandi difficultate prodeſſe, duros "lienis tumores emollire, urinam ciere, arenulas expellere, "et mulierum menſes ſuppreſſos promovere." It might have been expected from the good judgment of Mr. Geoffroy, that he would have concluded this account as he had done one before, with ſaying, "Ejus virtutes longe remiſſiores et debili-"ores eſſe, uſus et experientia demonſtraverunt."

The firſt writer of the 17th century whom I think it neceſſary to mention is, JOHN SCHROEDER; and that not for his own merit, but for his having been ſo long conſidered as

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an authority in these matters. He has been quoted by the latest writers; and his very words have been transcribed by Ray, Dale, and Alston; and an edition of his work, in the German language, was published in the year 1746: all which may be sufficient to show how slow the progress of discernment has been in the business of the materia medica.

In the year 1646 Schroeder published his Pharmacopœia Medico-chymica, which might have been intitled Galenico-chymica; and by uniting the Galenical and chemical pharmacy together in one book, he recommended his work to both the parties then subsisting. He is systematic, and as complete as the then state of science could well allow.

His chemistry, after the labours of Hartman, Quercetan, Libavius, and Angelus Sala, is more correct than it had been in the hands of Paracelsus and his immediate followers. He is, however, luxuriant in chemical preparations to the highest degree, and shews to what a wonderful number these had arisen in the course of a hundred years; but he is still fraught with all the folly, fanaticism, and extravagant commendation which had prevailed among the writers of that sect. The Galenic doctrine of Schroeder, though much followed afterwards, was in no better condition. He has followed the ancients in all their faults, and has repeated after them, without any reserve or even the smallest correction. He is still entirely in the Galenic system of the cardinal qualities and their different degrees, and is full in the doctrine of the elective qualities of purgatives. In following the ancients, he delivers the virtues of medicines by their general qualities and supposed powers, upon no proper foundation; and I might say, very often upon a false one.

The next writer to be mentioned is JOHN BAUHIN. His botanical merit is not to be taken notice of here; and I am only to speak of what in his Historia Plantarum he has written on the virtues of those plants which make a part of the materia medica. Upon this subject he was learned; and so diligent a compiler, that he may be read instead of all those who had gone before him. He has compiled, however, without any choice of authorities, and without omitting or correcting the mistakes that had before prevailed on the subject. He certainly did not deserve to be followed as he has been

been by Ray and others after him; and by no means deſerves to be read now.

Not long after the work of John Bauhin, there appeared the Botanicum Quadripartitum of SIMON PAULI; which has been ſo much reſpected by after writers, that it is proper to take ſome notice of it here. After I had looked into this writer, I was a little ſurpriſed to find this character of him in Etmuller: "Simon Pauli, qui eſt elegans et ſimul tamen copioſus autor, atque cum judicio ſcripſit;" and I was ſtill more ſurpriſed by finding this character of him in Geoffroy: "Simon Pauli, vir ſane doctus et ingenuus." Pauli, indeed, who lived in the literary age of Copenhagen, had much erudition; but it was of the moſt frivolous kind, and without affording any correction of the imperfections and miſtakes which had appeared in the writers whom he quotes, or ſhowing any choice in the authorities he makes uſe of. He gives us often his own obſervation and experience: but the reſult of them is commonly ſo improbable, that I can give him little credit; and hardly in one of twenty inſtances in which Mr. Geoffroy has been pleaſed to quote him. His accounts are often delivered with ſuch a trifling garrulity, that it is impoſſible to conſider him as a man of good ſenſe; and from much experience I have now formed an opinion, that from men of weak judgment facts and pretended experience are not to be relied on.

Soon after Simon Pauli appeared GEORGIUS WOLFGANGUS WEDELIUS, who in a work under the title of Amænitates Materiæ Medicæ, has attempted to reduce the ſubject to principles; but both his phyſiology and pathology are ſo imperfect, that I cannot find him to have thrown any light upon the buſineſs. He is ſtill an abettor of the doctrine of ſignatures, as well as a believer in the power of amulets; and with regard to what he ſays further of the virtues of particular ſubſtances, he ſeems to be entirely guided by thoſe who had gone before him.

There is hardly any notice due to EMANUEL KOENIG, who towards the end of the laſt, or ſoon after the beginning of the preſent century, publiſhed on all the parts of the materia medica: He alſo attempted to reduce the matter to principles; but he does it in a very imperfect manner, and there is

is not a folly in any foregoing writer that he does not diſcover in his work. In treating of particular ſubſtances he is a mere compiler, with as little judgment as any we have upon the ſubject.

Jean Baptiste Chomel begun to read lectures upon the materia medica about the beginning of this century, and publiſhed his Abregé de l'Hiſtoire des Plantes uſuelles in 1712. The work does not appear to me to be a very valuable one; but there have been repeated editions of it, and the laſt by his ſon in 1761, ſhows me that much improvement in the knowledge of the materia medica had not made any progreſs in France.

Mr. Chomel, however, has his merit. He does not tranſcribe Schroeder as many others had done. He has entirely omitted the Galenical doctrine of the cardinal qualities and their degrees; and though he was an eleve of the great Tournefort, he does not repeat after him the explanation of the virtues of plants by the oils, ſalts, and earths, which the chemical analyſis had ſeemed to point out

Mr. Chomel has choſen, as I judge, a proper plan of arranging the ſubjects of the materia medica, according to the ſimilarity of their virtues in anſwering the general indications of cure. In this, however, he appears to be extremely imperfect. He has hardly upon any occaſion explained theſe indications in a manner that can at preſent be admitted. Many of them ſeem to be abſolutely improper; and moſt of them, if at all admiſſible, are too complicated to be employed with any clear inſtruction or even with ſafety to ſtudents.

Under the ſame titles he has often aſſociated plants of very diſſimilar, and even of oppoſite nature and qualities; and he has often inſerted inert ſubſtances, that did not deſerve to have a place any where.

Beſides giving the general qualities, he mentions particular virtues which might not ſeem to ariſe from the general qualities. In this, however, he is not very fortunate, as he found it neceſſary for him to repeat after the writers that had gone before him. He does not indeed tranſcribe Dioſcorides

corides and Galen ſo much as others had done; but he has not omitted their opinions ſo often as with propriety he might. In quoting his modern authorities, he does not make the ſelection nor ſhow the judgment that might be deſired. Tragus, Tabernæ montanus, Matthiolus, Zacutus, Schroeder, John Bauhin, Simon Pauli, Etmuller, Koenig, Boyle, and Ray, are not neceſſarily bad authorities: but they are certainly ſuch when they deliver very improbable events; and their being quoted for ſuch, frequently occurs in Chomel.

Chomel himſelf ſhould be valuable, by his frequently reporting his own experience: but in a variety of inſtances he does this with reſpect to many ſubſtances which we preſume to be very inert; and with reſpect to many, when the power aſcribed, and the cures ſaid to be performed, are very improbable. Perhaps, however, too much has been already ſaid of this author; and it would be tedious to point the many inſtances that might be mentioned of his incorrectneſs and miſtake.

Stephen Francis Geoffroy was a man of genius, and in many reſpects of good judgment, though this does not always appear in his writings on the materia medica. In his book on this ſubject, when treating of vegetables, he gives us an exact account of the analyſis made by the direction of the academy of ſciences: Theſe are now not conſidered as of much uſe; but Mr. Geoffroy often attempts to explain the virtues of plants by the ſalt, oils, and earths which they ſeem to contain: in which, however, he gives little inſtruction; and as we have ſaid above, the doctrine in general is falſe and ill founded.

In giving particular virtues, Mr. Geoffroy ſeldom does it from his own experience, and generally upon the authority of former writers; and in this he does not ſhow much judgment, either in ſelecting thoſe authorities, or in correcting either their extravagant commendations or their manifeſt miſtakes. An example of this has been already given in one of the quotations he makes from Tragus; and in many other places he appears equally injudicious in quoting from that author. I have mentioned above his character of Simon Pauli, and have given ſome reaſons for my thinking it

it ill founded; but the beſt proof of this are the very quotations which Mr. Geoffroy makes from him. On the ſubject of vegetables, in almoſt every page Mr. Geoffroy quotes from Pauli; but ſeldom with much judgment. I can by no means admit, upon the authority of Pauli, that Carduus benedictus can heal cancers, or that the Anonis can be a certain remedy for a ſtone either in the kidneys or bladder. In repeating ſuch accounts, Mr. Geoffroy appears to me injudicious; and he is certainly trifling in quoting Pauli for the uſe of the diſtilled water of Aparine. It will hardly now a-days be received upon the authority of Pauli, that the ſeed of the aquilegia has been of great uſe in the ſmall-pox and meaſles, and ſtill leſs that it has the power of aſſiſting in the birth of children; and it gives no credit to the judgment of Mr. Geoffroy, that he confirms the virtues of this ſeed by his own experience. Mr. Geoffroy quotes the authority of Simon Pauli for the bellis minor being highly uſeful in the cure of ſome deſperate caſes of phthiſis pulmonalis; and it is a weak ſupplement to the authority of Wepfer, which, however, in this caſe is hardly ſufficient. Upon the authority of Simon Pauli it is difficult to believe that the decoction of clove-julyflowers had ſerved to free numberleſs perſons from malignant fevers. To conclude, Mr. Geoffroy can receive no credit by repeating after Pauli, that the Argentina, by being put into the ſhoes of the patients, had proved uſeful in dyſentery and all kinds of hæmorrhagy. I have now ſaid enough of Mr. Geoffroy's injudicious quotations from Simon Pauli, and I could give many inſtances of his being equally injudicious with reſpect to the other writers whom he quotes; ſo that from this, and many other circumſtances, his compilation may be judged to be of very little value.

Mr. Geoffroy in his own lifetime did not complete his treatiſe on the materia medica, leaving a great number of the indigene plants of France unmentioned; but his work was ſo much valued, that it was thought proper to give the public a ſupplement, which has been done in three duodecimo volumes. This indeed is executed very much in the manner of Mr. Geoffroy's own work; but notwithſtanding the great name which in the preface is ſaid to have reviewed it, I muſt take the liberty of ſaying, that in quoting authorities the ſupplement is equally trifling and injudicious as the

the work of Mr. Geoffroy himself; so that upon the whole, it is of very little value.

In the list of writers on the materia medica, I cannot omit the Synopsis Universæ Praxeos Medicæ by Mr. LIEUTAUD. The second volume of this work, which is entirely de Medicamentis, may be considered as a treatise of the materia medica; and though it be such as I cannot esteem, yet as being a late publication by a man of the highest rank in the profession, I think proper to take notice of it, as marking for the time the state of the materia medica in one of the most enlightened nations of Europe.

Mr. Lieutaud has distributed the subjects of the materia medica according to the general qualities by which they are adapted to the several indications arising in the practice of physic: but it must be observed, that the indications marked are for the most part ill defined, too general, as well as too complicated, to convey any instruction to young practitioners; and they are truly exposed to all the objections I made to those of Chomel. Let us take as an example Mr. Lieutaud's title of Febrifuga. Under this title, of the substances enumerated, some are astringent, some are bitter, others aromatic; even the aloe and gummi gutta are inserted; and, on the same ground, fifty more might have been added. Very possible most of the substances mentioned, may upon one occasion or other, be employed in the cure of fever; but they are certainly adapted to different circumstances of the disease: and as they are here huddled together, they can give no instruction, and may often mislead. From this article, and from many others, it may be observed, that Mr. Lieutaud might have given a more useful arrangement, by throwing together the medicines of similar qualities; but in this and every other enumeration in his book, he has given the several medicines in a promiscuous and very discordant order. Under the article of *Febrifuga*, the enumeration of his *emporetica* proceeds in this manner: "*Radices taraxaci, foeniculi, pentaphylli, asari, gentianæ;*" and yet there can hardly be a more discordant set of substances.

These, however, are not the only faults of Mr. Lieutaud's enumerations; for in many instances, substances are enumerated

rated that do not at all belong to the title under which they are placed. Thus, under the title of Antiputrida, we find various animal ſubſtances; under Refrigerantia, there occurs *Cerevifia;* under Aſtringentia, there are the *Sophia chyrurgorum*, *Burſa paſtoris*, and *Polygonatum;* under the Stomachica is put the *Iris Germanica;* and under Emollientia the *Senecio*. Theſe are miſtakes which perhaps may be conſidered as overſights *in opere longo;* but there are ſome general opinions, deliberately given, which cannot ſo eaſily admit of excuſe. In almoſt every one of his enumerations, we find ſubſtances either abſolutely inert, or of ſo little power, that for a long time paſt they have been entirely neglected in practice. Mr. Lieutaud, however, has found virtues in them which no body elſe can diſcover. Such, amongſt others, are the diſtilled waters which he frequently preſcribes; and which, notwithſtanding his vindication of them, have been properly rejected from moſt of the diſpenſatories of Europe, excepting that of Paris.

The *Ebur*, *Cornu cervi præparatum*, *Cranium humanum*, *Ungula alcis*, *Pulvis bufonum*, *Cortex ſuberis*, and many others of like kind, if they were to appear in preſcription, would, in Britain at leaſt, effectually diſgrace a practitioner. Some preparations formerly commended and in uſe, are now by many thought to be inactive and ſuperfluous; as the *Cinnabaris factitia et antimonii*, the *Antihecticum Poterii*, *Antimonium diaphoreticum*, *Æthiops mineralis*, and ſome others of at leaſt diſputed virtue; but Mr. Lieutaud retains them, and ſometimes with much commendation of their virtues. In treating of particular ſubjects, he does not, like Chomel and Geoffroy, chooſe to quote his authorities; but he manifeſtly repeats the common-place accounts of former writers, and is every where liable to the cenſure which Galen applied to Dioſcorides, of aſcribing too many virtues to the ſame ſubſtance. Like many other writers, he imputes to ſeveral medicines very improbable effects. He mentions the Fragaria and Dens leonis as being remedies *in pollutionibus nocturnis;* the Radix graminis as being anthelmintic and lithontriptic; the *Bedeguar* employed for the cure of the bronchocele; *Coffee* as uſeful in preventing rickets; *Polypodium* in the cure of ſcrophula; and the *Euphraſia* as mending the

viſus imbecillitas in ſenibus: He mentions the *Avenæ* as proper *ad fugandam puerperarum lac;* and there can be nothing more remarkable than his account of *Cereviſia* bringing on ſtrangury and a *gonorrhœa ſpuria*. He recommends many ſubſtances for healing internal ulcerations, for the moſt part an improbable effect; but his commending the *oleum terebinthinæ* for this purpoſe, ſeems to me a very dangerous doctrine.

Many other miſtakes, inaccuracies, and even frivolous things, might be pointed out in this work; but it is believed that enough has been ſaid to ſhow that it cannot be conſulted with any advantage, nor even with ſafety.

I have inſinuated above, that Mr. Lieutaud's work might be conſidered as ſhowing the ſtate of knowledge on this ſubject in France at the time of its publication; and it certainly may be conſidered as ſhowing it to be then in many perſons of that country in a very imperfect condition: but it may be alleged that Mr. Lieutaud, who was, little engaged in practice, who lived very conſtantly at Verſailles, and had little communication with the literature of Paris, cannot be conſidered as giving a proper ſpecimen of the learning and judgment which prevails among the many ingenious men who are to be found in that city.

Since the time of Mr. Lieutaud, there has been publiſhed at Paris a Traité, de Matiere Medicale, extraite des meilleurs Auteurs, et principalement du Traite des Medicamens de M. de Tournefort et des Lecons de M. Ferrein. This work I conſider as ſuperficial and incorrect, and in every reſpect unworthy of Mr. Ferrein, who was a man of learning and judgment, and, if he had been ſtill in life, would never have countenanced the publication.

Some amends for this has been made by the publication of the Precis de Matiere Medicale, par M. Venel. This is a poſthumous work, and which perhaps the ingenious author, if he had lived, would have given himſelf in a more perfect ſtate; but even as it is, the public are indebted for it to Mr. Carrere. It appears to me the moſt judicious writing that has yet appeared in France upon the ſubject; and

and the perusing it frequently recalls to my mind these two lines:

> "Poets lose half the praise they would have got,
> "Were it but known what they discreetly blot."

Mr. Venel is remarkable for omitting the many idle things which former writers repeated after one another; and he has gone still further in correcting many of those prejudices which prevailed among the vulgar physicians and writers upon this subject. His chemistry and pathology are not always correct; but are always ingenious, and often probable; and if he had continued to study the subject, there is every reason to believe he would have rendered it more complete and perfect. Mr. Carrere, by his notes and several useful additions, has done a great deal to this purpose, and has rendered the work very valuable.

I proceed now to the writers of Germany. Of these, ZORN, as in the style of Linnæus compilatissima, and G. HENRY BEHR, as superficial and incorrect, are below criticism. BUCHNER and LOESECKE are more respectable; but any instruction they afford on the subject of the materia medica is extremely imperfect.

The first writer of Germany who deserves our notice is JOHN FRED. CARTHEUSER, the author of the Fundamenta Materiæ Medicæ; which is a writing of deserved reputation. The author has distributed the several subjects according to their sensible qualities, or to their more obvious chemical constitution; and by this he has very properly associated many substances by their natural affinities. This, however, does not go throughout; for under several of his general titles, such as those of his X. XIV. XV. sections, he has often associated substances of very dissonant qualities and virtues, while by the same distribution he has separated substances of very similar qualities, and therefore such as should have been with some advantage viewed together.

Upon particular subjects he has given, with great exactness, the chemical constitution of substances, according as they are volatile or fixed; as they are saline, oily, gummy,

or reſinous; and as theſe parts of bodies are obvious without any violence of fire applied. He has given this account from his own experiments; and by theſe, as well as by thoſe of Newman and of ſome others of a like kind, we are often well inſtructed in the moſt proper pharmaceutic treatment of medicines: but from experiments of that kind we ſeldom obtain much light with reſpect to the medicinal virtues.

As to the medical virtues of ſubſtances, Mr. Cartheuſer is not much wiſer than others: He often attempts to explain the virtues of medicines by their chemical conſtitution, but in no ſatisfying manner. His account hardly goes farther than that medicines are more or leſs active; but he does not at all explain the various modification or application of that activity. With reſpect to particular virtues, he repeats very much after preceding authors; and in general, like them, aſcribes too many virtues to the ſame ſubſtance; ſo that he ſeldom gives any uſeful inſtruction.

It may be remarked alſo, that he has employed general terms, which are not only ill defined, but alſo very often complicated, and ſometimes altogether improper. As an example of this, and indeed of the extravagance of writers on the materia medica, here is Cartheuſer's account of the virtues of zedoary: "Vires medicæ hujus radicis maxime "quidem volatili principio oleoſo camphorato adſcribendæ "ſunt, valde nihilominus activitatem ejus fixa quoque prin- "cipia reſinoſo gummea augent. Militat inter efficaciſſima "tametſi paullo calidiora medicamenta diſcutientia, ſudo- "rifera, alexipharmaca, pectoralia, cardiaca, ſtomachalia, "carminativa, anthelmintica et uterina, ac rite uſurpata, "eximium ſubinde auxilium in morbis exanthematicis, fe- "bribus malignis et catarrhalibus adfectibus frigidis rheu- "maticis, cachecticis et oedematoſis, tuſſi et aſthmate "pituitoſo, anxietatibus præcordialibus, dyſpepſia, dyſor- "exia, vomitu, diarrhœa mucoſa, cardialgia et colica vere "flatulenta, fluore albo, ſuppreſſione menſium chronica, "partu difficili, et placentæ uterinæ retentione præſtat." *Cartheuſer*, Sect. XIV. § 3. This is certainly extravagant; and that any inſtruction can be properly derived from it, I cannot perceive.

In

In 1758, the late learned and induſtrious Rud. Aug. Vogel publiſhed his work, intitled Hiſtoria Materiæ Medicæ. The ſubjects of the materia medica are here diſtributed according as they are taken from the leaves, from the roots, or from other parts of plants, which form no connection in the materia medica. He likewiſe diſtributes theſe ſubjects according as they are uſitata, minus uſitata, and obſoleta; and ſuch a diſtribution might have its uſe: but that of Mr. Vogel cannot have much, as it is not taken from the nature of the ſubſtances themſelves, as more or leſs fitted for uſe; but from the practice of a particular country, which cannot afford much inſtruction; for in Mr. Vogel's liſts many are marked as uſitata which are not at all employed in Britain, and in his obſoleta many that are ſtill frequently employed here.

In treating of particular ſubſtances, he repeats after others with no nice ſelection of authorities nor with ſound judgment on the nature of the ſubject. He renounces all principles deduced from reaſoning; and holding he is to give only what experience has taught, he, in the firſt place, gives us a liſt of ſpecifics; and I ſhall here mark ſeveral of theſe as ſpecimens of his judgment and experience. Thus, ad podagræ dolores leniendos, *Bufo uſtus;* ad phthiſin, *Plantago, bellis;* in ictero, *flores cheiri;* in alvi profluvius, *bolus Armena, chryſtallus montana;* in ſarcocele, *Sambuci flores;* in rachitide, *Sarſaparilla;* ad ſcabiem, *Hedera terreſtris, Bonus henricus.*

To conclude, with reſpect to what may enable us to form a judgment of Mr. Vogel, let us take one other ſpecimen from what he ſays of hirundo: "Integræ hirundini "virtus tribuitur analeptica, et ad viſus hebetudinem ſpeci- "fica. Pullum, ſi quis comederit, angina per totum an- "num non periclitari; ſervatum e ſale cum is morbus ur- "get, combuſtum, carbonemque ejus in mulſo contritum "et epotum, prodeſſe *refert e Plinio Celſus!*

Another German profeſſor, Henr. Jo. Nepom. Crantz, has given us a Treatiſe of the Materia Medica et Chirurgica. Here is a modern author who in my opinion has done nothing to advance the knowledge of the materia medica.

He

He does not indeed like Vogel disclaim principles; but those which he employs are seldom scientific and judicious. He transcribes from the ancients with as little discernment as those who had written before him; and although he has been at pains to collect the latest discoveries, or pretended discoveries, in the materia medica, yet it is seldom with any mark of his own judgment, either in chemistry or medicine; so that upon the whole his compilation is of very little value.

The late professor SPIELMAN of Strasburg has given us Institutiones Materiæ Medicæ, in which he has distributed medicines according to their indications; and in reducing the indications to a lesser number, he has been more chaste than many who had gone before him. This brevity, however, has often rendered him obscure; and his general titles can hardly be applied to any use. In delivering the virtues he is commendably concise, but becomes thereby in many cases superficial. He is very fond of quoting Hippocrates and Galen, but does it in many instances where the authority of these venerable ancients is of little weight.

Besides the institutions, Mr. Spielman has published a Pharmacopœia Generalis; in the first part of which he has given a materia medica full of superfluities; and with respect to the virtues of the substances in use, he is superficial and incorrect. In the second part, or the proper pharmacopœia, he has also much superfluity; and by the luxuriancy of composition which he almost every where exhibits, discovers to me an absolute want of all discernment in the business of the materia medica.

To make amends for the errors and defects of preceding writers, the public have now received the Apparatus Medicaminum of the very learned and ingenious professor MURRAY of Gottingen. This work is not yet finished; but it promises, when concluded, to be the most complete and perfect that has ever appeared upon the subject. In so far as it has yet proceeded, the author with great judgment and medical discernment has, from former writers, and more especially from those of latest date, collected every thing which deserved to be repeated. He every where discovers an intimate acquaintance with all the writers on the subject,

ſubject, and always makes a judicious ſelection of what they afford. By his diſtributing the vegetable ſubſtances according as they belong to the ſeveral natural orders marked by the botaniſts, he has aſſociated the ſubſtances of ſimilar qualities and virtues, in a manner that may be of great advantage to ſtudents.

This author, who is a native of Sweden, does credit to his country, and has deſervedly received honours from it; but from his preſent ſituation at Gottingen, I have claſſed him amongſt the writers of Germany, and ſhall next proceed to mention thoſe who more ſtrictly belong to Sweden.

Of theſe, the firſt to be taken notice of is the very reſpectable CAROLUS A LINNE, from whom we have, as it is now publiſhed by Schreber, a complete treatiſe of the materia medica. Before offering any opinion reſpecting this work, it will be proper to remark, that in another treatiſe this learned author has ſhown a very ſound judgment. What I allude to, is the Cenſura Simplicium, publiſhed in the fourth volume of the Amœnitates Academicæ; in which the liſt of Excludenda ſeems to me every where proper and judicious, correcting in many inſtances the errors and futilities of former writers. In his liſt of Addenda, indeed, as well as in his Plantæ Officinales, there are many articles which are doubtful; but it is not neceſſary to point them out here.

After Linnæus had, in the Cenſura Simplicium, ſhown ſo much judgment in rejecting the inert and ſuperfluous, it is rather ſurpriſing to find ſo many of theſe ſubſtances ſtill mentioned in his Materia Medica, which he himſelf marks as ſuperfluous, and which ought to have been omitted altogether. Beſides, nothing can be more frivolous than what he has given reſpecting the ſubſtances taken from the animal and mineral kingdoms; for at leaſt three-fourths of them neither are at preſent, nor in any ſhape deſerve to be employed.

The ſubjects of the vegetable kingdom are diſtributed according to his own botanical ſyſtem; and as that in ſeveral places admits of natural orders, it is in ſo far uſeful: but this does

does not go the length of rendering the distribution in general proper. Upon particular subjects, he seems disposed to ascribe too many virtues to every substance, both in the articles of VIS and USUS. In the latter article there may be information to persons well acquainted with the subject; but in many instances it is doubtful, and, in my opinion, very frequently ill founded. With respect, however, to the whole that Linnæus has delivered on the materia medica, from vegetables, our attention is very much superseded by the work given us on the same subject by his scholar BERGIUS.

The Materia Medica ex Vegetabilibus, by PETRUS JONAS BERGIUS, is a work truly of great value, and very much deserving our notice. It is precisely upon the plan of Linnæus; and therefore the same observations we made on the distribution of that author may be applied to it. We have here, however, a very valuable addition to Linnæus in the article of FORMA, which gives a very full and very exact description of the substances used in the materia medica. Where the substances are used in their recent state, the description is of all the several parts of the plant; which, I believe, is every where exact, and may be useful, though perhaps it was not always necessary. But with respect to those substances which we know, and use only in their dried state, the descriptions of Bergius are very proper, and, as being particularly correct, must be very useful.

In the article of PROPRIETAS, which comes in place of the QUALITATES of Linnæus, Bergius has made a great improvement, in giving the sensible qualities of the substance as used in medicine, both in its recent and dried state, and leads us often to determine how far medicinal virtues are connected with the sensible qualities.

In the articles of VIS and USUS, Bergius, in ascribing virtues, is much more chaste and correct than Linnæus: but indeed the manner of treating the subject is in both writers liable to doubt and obscurity, and neither very fit nor sometimes perhaps very safe for the purpose of informing students.

After

After these remarks on the work of Bergius, I must add, that he has given a very valuable addition in the observations which he has subjoined to almost every particular subject. In these he has communicated much useful instruction with respect to both the medical qualities and the pharmaceutic treatment; but I can say no more of these observations here than to recommend them earnestly to the reader's attention.

It now only remains to mention the very few British writers, who have been always deserving our notice. Of Mr. RAY enough has been already said; and Dr. DALE, as being chiefly a transcriber of Schroeder, has made no improvement with respect to the medical virtues. Dr. ALSTON, my late worthy colleague, has given a treatise that must be supposed to have been composed long before its publication. It is not without many faithful observations derived from his own experience; but his transcripts from Schroeder, and others of no better authority, render his work very tedious and of little importance.

We have had a bulky work on the subject from the well-known Dr. HILL. It is merely a compilation, without selection or judgment; and neither in that work, nor in his particular dissertations, so far as he refers to his own experience, is he not received in this country with any credit.

The only English work that does any credit to the country, or has made any improvement in the materia medica, is the Treatise of the late Dr. LEWIS, and especially as published and judiciously enlarged by Mr. AIKEN. As Dr. Lewis had undertaken to treat of all those subjects which had appeared in the lists of the London and Edinburgh Dispensatories, so he had from this last introduced a great many which did not deserve a place; and I think Mr. Aiken has with great propriety marked out those which have been since expunged by the Edinburgh College themselves. When these articles are thrown aside, the rest of Mr. Lewis's work is one of the most judicious that had at that time appeared on the subject. Not to mention his correct

correct deſcriptions of drugs, and his uſeful experiments in their treatment, by different menſtruums, he is very chaſte in aſcribing virtues, and in repeating from former writers; and from his own experience, as well as that of the moſt ſkilful London practitioners, he gives a ſounder judgment of the real virtues of ſubſtances than had been given before.

There yet remains another Britiſh writer to be mentioned, and that is the late worthy Dr. RUTTY of Dublin, the author of the Materia Medica Antiqua et Nova. He tells us it has been a work of forty years; which to me, who think there is little to be learned from the ancients, is no great commendation. He has compiled very faithfully from the ancients, not even omitting Galen's account of the cardinal qualities and their degrees; and as he has repeated all the follies and imperfections that I have alleged are to be found in the ancients, I cannot find this part of Dr. Rutty's work to be of any uſe; and with ſtudents it may often miſlead. Dr. Rutty has given a very large liſt of the materia medica: but as in that liſt he has inſerted a great number of ſubſtances abſolutely inert, or nearly ſo; as he has inſerted many ſuperfluous, as having in a leſſer degree the ſame qualities with others, and many which, by their being inert or ſuperfluous, have now become obſolete; his work is no way uſeful in proportion to its bulk. When he treats of medicines which are ſtill in uſe, he gives us ſome obſervations of his own; but for the moſt part he repeats the common-place accounts with no ſingular judgment, and generally aſcribes too many virtues to the ſame medicine.

I have thus endeavoured to give a Hiſtory of the Materia Medica; and have taken the liberty of offering the judgment which I have formed of the chief writers who have written upon it. As there has occurred more occaſion to blame than to commend, it has been a diſagreeable taſk; and I am afraid that the public opinion may be offended by my diſparagement of the Ancients. I deemed it proper, however, to hazard this, becauſe I truſt, in the progreſs of this work, the judgment

ment I have offered will be fully juſtified; and it ſeemed neceſſary to inform ſtudents from whence they might moſt properly and ſafely draw their inſtruction, and be put upon their guard againſt opinions which might deceive and miſlead them.

A TREA-

A

TREATISE

ON THE

MATERIA MEDICA.

INTRODUCTION.

BEFORE entering upon the conſideration of particular medicines, it may be proper to treat of what in general relates to the operation of all of them. There are certain principles which have a reference to the whole; and by explaining theſe in the firſt place, we ſhall not only ſave afterwards much repetition that might otherwiſe have been neceſſary, but, by having laid down theſe general principles, it may be poſſible, in a more ſimple and clear manner, to explain the operation and virtues of particular medicines.

It is the more requiſite to enter upon the conſideration of thoſe general principles, that there are ſeveral to which phyſicians do not appear to have given the attention which ſeems to be neceſſary. Beſides, it is well known, that with reſpect to the juſtneſs and propriety of many of the principles which have been adopted, phyſicians are very far from

from being agreed: and I therefore deem it neceſſary to offer my peculiar ſentiments with reſpect to many of thoſe principles that have been before aſſumed, and more neceſſary ſtill to explain certain new principles which I ſhall think it requiſite to employ. In the laſt, indeed, I perhaps hazard a great deal; but every part of ſcience is ſtill imperfect, and muſt for ever remain ſo, if attempts be not made to improve it.

With theſe views, it is to be remarked, in the firſt place, as a principle commonly aſſumed upon this ſubject, that few or no medicines act upon the living human body in the ſame manner, and with the ſame effects, as upon inanimate matter; and it is now well known, that the operation and effects of ſubſtances applied to the living human body, are for the moſt part altogether different from the effects of the ſame application to the dead body. Few indeed, or none, of theſe ſubſtances which are conſidered as medicines, have any effects at all upon the dead body; and therefore, aſſuming this as a principle, when hereafter I ſhall have occaſion to ſpeak of the action of ſubſtances upon the body, it muſt be conſtantly underſtood to be their action upon the living body only; and at leaſt with very few exceptions, which ſhall be taken notice of when occaſion requires.

Having aſſumed this principle, it muſt be obvious, that, in order to conſider the operation of medicines in general, it will be proper to begin with explaining the peculiar circumſtance of the human body, by which it is thus capable of being acted upon in a peculiar manner by other bodies applied to it; and it will alſo be requiſite to enquire concerning the manner in which the general operation of medicines may be variouſly modified, according to the different ſtates and circumſtances in which the human body may be upon different occaſions.

CHAP-

CHAPTER I.

OF THE ACTION OF MEDICINES UPON THE BODY IN GENERAL.

IN theſe days, it is hardly neceſſary to ſhow that the action of other bodies upon the human, is chiefly by the impulſe of theſe bodies upon the extremities or other parts of the nerves of the human body; in conſequence of which, a motion is propagated from the place of impulſe along the courſe of the nerves, to their origin in the brain or medulla ſpinalis; and that, upon ſuch occaſion, there does for the moſt part ariſe a *ſenſation*. This again generally gives occaſion to a *volition*; whereby a motion is produced, which being determined along the courſe of the nerves into certain muſcles, or moving fibres, the action of theſe, as well as the various effects which their action is ſuited to occaſion, are in conſequence produced.

This is the general idea of the connection of the human body with the other parts of nature; or of the manner in which the human body is acted upon by other bodies, and in its turn acts upon theſe. That condition by which it is fitted

fitted to have peculiar effects produced in it by the action of other bodies, is called its *Senſibility*; which ſeems to be lodged in every part of what we can diſcern to be parts of its nervous ſyſtem: And that condition of the body by which certain parts of it are fitted to have certain motions of contraction excited in them, either from a communication with the nervous ſyſtem, as expreſſed above, or by an impulſe directly made upon theſe parts themſelves, is termed the *Irritability* of the body; which ſeems to exiſt only in the muſcular or moving fibres, probably of a peculiar ſtructure ſuited to that purpoſe.

From all this, we come at this concluſion, That the peculiar effects of ſubſtances in general, or of thoſe ſubſtances in particular which we call *medicines*, when applied to the human body, depend upon their action upon its ſentient and irritable parts.

It is, however, to be remarked here, that the action of ſubſtances in producing their effects, is not univerſally, as inſinuated above, by the intervention of ſenſation and volition; for theſe effects are often produced without either the one or the other. At the ſame time it is probable, that in all caſes the effects produced by the action of other bodies upon the human, although not accompanied with ſenſation, yet are produced by their action upon the ſentient parts; and it is likewiſe probable, that in the caſe of action unaccompanied with any volition, both the action and its effects, depend either upon the application of thoſe bodies directly to the irritable parts, or upon their application to ſentient parts, which determine motions into thoſe very nerves wherein motions are commonly excited by volition. Upon the whole, it is ſufficiently probable, that the peculiar action of medicines depends upon the ſenſibility and irritability of the human body; or, in other words, that it univerſally depends upon motions excited and propagated in the nervous ſyſtem. Theſe, therefore, are the conditions of the living body which we were engaged to explain. What is the nature of the matter in which theſe motions take place, or in what manner it is inherent in the nervous ſyſtem, is not well known: but we think it may be juſtly held as

as exiſting, and may ſpeak of it under the appellation of the *nervous power*. As it appears only in the living and diſappears entirely in the dead ſtate of the body it may be otherwiſe properly enough termed the *vital principle*.

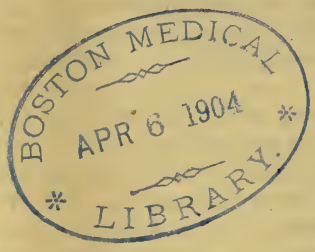
It does not ſeem neceſſary to explain fully here the various laws by which the motions of the nervous ſyſtem are regulated and governed: but with reſpect to the operation of medicines, this in general is to be obſerved, that as there ſeems to be a poſſible communication of motion from every part of the nervous ſyſtem to every other part of it; ſo medicines, though applied to one ſmall part of the body only, do often, in conſequence of the communication mentioned, ſhow their effects in many other parts of the body.

This ſympathy or conſent, as it is called, of the ſeveral parts of the body, is in general very well known to phyſicians; and I ſhall have occaſion frequently hereafter to take notice of it, in mentioning the effects depending upon it, and the laws by which it is governed. At preſent I am to proſecute the conſideration of it no farther.

Having now conſidered the action of medicines as in general upon a living body, it may, in the next place, be obſerved, that as the effect of the action of one body upon another does always depend, partly upon the general operation of the body acting, and partly alſo upon the particular circumſtances of the body acted upon; ſo it is well known, that as the human body is in ſeveral reſpects conſiderably different in different men, and even in the ſame perſon at different times, ſo the operation of medicines upon it muſt be variouſly modified according to the different circumſtances in which the body may happen to be, and that, either throughout the whole of life in different men, or upon particular occaſions in the ſame perſon.

It is therefore neceſſary, before going further, to conſider thoſe differences in the ſtate of the human

body which may occur and give occaſion to a difference in the operation of medicines upon it. We ſhall, therefore, proceed to conſider thoſe conſtitutional differences which take place throughout life, under the title of *Temperaments*, this being the appellation under which theſe diverſities are commonly mentioned.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SECT. I.

OF TEMPERAMENTS.

IN attending to the great number of circumſtances in which the bodies of men may be different from one another, it is ſcarcely poſſible to enumerate every particular: but it has been at all times preſumed, that a great number of theſe circumſtances are commonly combined together in the ſame perſon; and that frequently one man ſhows a combination of circumſtances not only different, but ſometimes of an oppoſite kind to that of another. Such combinations, upon a particular ſuppoſition with reſpect to their cauſes, the ancients named *temperaments*; and the term has continued to be employed in the ſchools of phyſic from the moſt ancient to the preſent time.

Abſtracting from all theory, we continue to employ the ſame term to denote a combination or concurrence of circumſtances which happens in certain perſons, but which in ſeveral reſpects is different from the combination that happens in certain others. Upon this footing, I believe the ancients diſtinguiſhed what they called the different temperaments of men; for it is probable that at firſt they diſtinguiſhed them by actual obſervation; but very ſoon they formed a theory with regard to them, from whence they formed appellations which have continued to be applied to them ever ſince. The appellations indeed have been continued, though the theories which laid the foundation of them have been long ago exploded; and the moderns have neither by obſervation extended the ancient diſtinctions, nor, though they have often attempted it, have they ever given, ſo far as I can judge, any happy explanation of the cauſes or foundation of the diſtinctions they have ſo generally adopted. I believe

it will be generally allowed, that this part of medical doctrine is ſtill in an embarraſſed and undetermined ſtate.

In treating the ſubject, philoſophy would require that I ſhould in the firſt place diſtinguiſh temperaments, by marking the external and obſervable circumſtances which are found with ſome ſteadineſs to be commonly combined together: but this I find a difficult taſk, and what my obſervation has not been ſo extenſively applied to as to enable me to perform in the manner I would wiſh. I muſt therefore proceed in another way; and ſhall endeavour to conſider thoſe circumſtances of the internal ſtate of the human body which may give occaſion to a difference in the ſtate of the functions, and even in the external appearances which diſtinguiſh different men.

Theſe circumſtances may, I think, be referred to five general heads according as they occur, 1*ſt*, In the ſtate of the ſimple ſolids; 2*dly*, In the ſtate of the fluids; 3*dly*, In the proportion of ſolids and fluids in the body; 4*thly*, In the diſtribution of the fluids; and, 5*thly*, In the ſtate of the nervous power. With reſpect to each of theſe heads, I ſhall now offer the beſt remarks, and give the beſt explanation, that the preſent ſtate of our ſcience ſeems to me to admit of.

ARTICLE I. *Of the ſimple Solids.*

Whether theſe are in certain parts of a fibrous, or if they are entirely of a cellular texture, it is not neceſſary to determine here. It is enough for our purpoſe, that they are at different times of a different degree of denſity and firmneſs. This particularly appears in the progreſs of life, when from an almoſt fluid ſtate they are gradually changed into a more denſe and ſolid ſubſtance.

The ancients marked the difference of temperament by the colour and ſtrength of the hair of different perſons; and many experiments ſhow that the ſtrength of the hair does for a great part of life follow the denſity of the ſimple ſolid in other

other parts of the body. Dr. BRIAN ROBINSON, in his Treatiſe of the Animal Oeconomy, has by many experiments clearly ſhown, that the denſity and ſtrength of the hair increaſe with the age of the perſon; and therefore, that the ſtate of the hair is correſpondent to that of the ſimple ſolids in other parts of the body. It is true, indeed, that the ſtate of the ſimple ſolid may in different perſons be conſiderably varied by the difference of diet, exerciſe, climate, and other the like circumſtances: but at the ſame time, as the ſtate of the ſolid ſeems to be often an hereditary condition, and as it frequently ſhows itſelf very early in life, before the circumſtances juſt now mentioned can be ſuppoſed to have modified its ſtate; ſo it is highly probable, that the ſtate of the ſimple ſolid depends upon the difference of the original ſtamina of the body: and as that difference will proportionally prevail throughout the whole of life; ſo, notwithſtanding the circumſtances in the manner of living, it will always have its ſhare in producing a difference in the ſtate of the ſolid in different perſons at the ſame period of life.

Whilſt, therefore, a difference in the ſtate of the ſolid muſt occaſion a difference in the whole of the ſtate of different perſons; ſo it muſt be admitted, that a difference in the ſtate of the ſimple ſolid muſt at all times have a ſhare in diſtinguiſhing the temperaments of men.

It being, however, farther probable, that the ſtate of the moving fibres is in ſome meaſure modified by the ſtate of the ſimple ſolid; ſo likewiſe it is probable, that the ſimple ſolid, according to its ſtate of denſity and elaſticity, muſt have a great ſhare in determining the ſtrength or weakneſs of the moving fibres, and conſequently of the whole ſyſtem, ſo as in this manner eſpecially to have a very powerful influence in diſtinguiſhing the different temperaments of men.

It here merits particular notice, that as the ſtate of the ſimple ſolid is for the moſt part likely to be proportionally the ſame throughout the whole of life; ſo there is reaſon to believe that, from incidental and ſudden changes in the ſtate of the ſimple ſolid, diſeaſes will ſeldom ariſe. This indeed may poſſibly be affected by various incidental cauſes: but they are either ſuch as very rarely occur, or ſuch as cannot be applied at once to a conſiderable portion of the ſyſtem; and which,

which, for the moſt part, take effect only when applied for a great length of time. I am perſuaded, therefore, that thoſe ſudden changes which frequently occur with reſpect to the debility and ſtrength of the ſyſtem, cannot be imputed to changes in the ſtate of the ſimple ſolid, which cannot ſuddenly take place, but muſt be imputed to changes in the ſtate of the moving fibres *quem facile mille res turbant.* Dr. BOERHAAVE gave little attention to the circumſtances laſt mentioned; but whoever ſtudies this ſubject, will perceive that the illuſtrious Profeſſor's doctrine *de fibra laxa vel rigida*, as explaining the cauſes of the *fibra debilis vel fortis*, will not apply ſo extenſively as he has ſuppoſed; and conſequently, that thoſe powers of changing the ſtate of the ſimple ſolid which have been imputed to internal medicines, are ſeldom to be regarded; or at leaſt never without a number of limitations, to which little attention ſeems to have been hitherto paid.

ARTICLE II. *Of the State of the Fluids.*

From the earlieſt accounts of phyſic with which we are acquainted, it appears, that from the moſt ancient times down to the preſent, phyſicians have been attached almoſt entirely to the ſtudy and conſideration of the fluids; and from the ſuppoſed ſtate of theſe, have endeavoured to explain the phenomena both of health and of ſickneſs. In this, however, they appear to me to have been unfortunate: for, not to mention the imperfection and falſehood of the many ſpeculations, both of Galeniſts and chemiſts, which have formerly prevailed on this ſubject, I would venture to aſſert, that the doctrine concerning the fluids is ſtill the moſt imperfect part of our phyſiology. Every thing ſyſtematical that has been delivered upon it, till within theſe laſt forty years, may be totally diſregarded: for it is only within the period now mentioned that we have acquired any diſtinct notions of a fundamental doctrine; or, in other words, of the ſtate of aggregation in the maſs of blood. Even with reſpect to this laſt, there ſtill remains much doubt and obſcurity; but notwithſtanding theſe difficulties, I ſhall endeavour to conſider what may be ſaid with regard to the ſtate of the fluids in different perſons.

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It may now safely be held, that the mass of blood, or that portion of our fluids which fills and flows in the red vessels, and from which all the others seem to be derived, is every where a heterogeneous aggregate, consisting chiefly and especially of three parts; to wit, red globules, gluten, and serosity: And if it should be alleged that there are other matters present, as perhaps there may be, I shall in the sequel examine the question; but in the mean while, I believe they may be considered as portions of the three principal parts now mentioned.

With respect to these principal parts, it is sufficiently probable that they are in a different proportion in different persons: and this different proportion may therefore have a share in giving some difference of temperament; although in what cases this takes place is not easily to be ascertained.

That the red globules may be in different proportions to the whole mass, we discern very clearly from several diseases, in which their quantity is evidently and considerably diminished; but what may be their proportion in persons in health, or in what manner that proportion is connected with the other circumstances of health, is by no means ascertained by any proper experiments. From several observations on animals whose vessels are easily subjected to microscopical examination, it appears that the proportion of red globules is greater or lesser according to the greater or lesser quantity of the aliment or nourishment the animal receives. It is very possible, therefore, that the quantity of them in the human blood may be affected by the same circumstances: But still this does not aid us in determining the question with respect to persons in health, who take in nourishment in proportion to their several bulks; and whether the effect of nourishment be determined by the quality, as well as by the quantity, is not ascertained. It appears to me, that, if at all, it is not affected much by the quality of nourishment, unless the difference of that quality be very considerable. It appears also that the proportion of red globules is as great in the animals living entirely upon vegetable aliment, as it is in those who live entirely upon animal food, or as it is in man, who lives partly upon the one and partly upon the other.

Many

Many attempts have been made to eſtimate the proportion of the quantity of the craſſamentum to that of the ſerum in the extravaſated human blood; but hardly any of the experiments yet made afford a certain concluſion. The apparent proportion of the two maſſes is very fallacious; being very much varied by the circumſtances which determine the concretion of the cruor to take place ſooner or later, and by the time which is allowed to paſs from the time of concretion to that at which the proportions are examined. It is now indeed well known, that theſe circumſtances vary the ſeparation which takes place; and it does not appear to me, that in any of the eſtimates which have been made, due attention has been given to the effect of thoſe circumſtances. When Dr. HALLER, in his Primæ Lineæ, paragraph 138, gives this judgment; "In maſſa ſanguinea media pars, et ultra, "cruoris eſt. In robore valido ſerum minuitur ad tertiam "partem, in febre ad quartam et quintam reducitur, in mor-"bis a debilitate increſcit;" I am perſuaded that he had judged entirely from the quantities that appear ſeparated in ordinary blood-lettings, and had not attended to the different quantities that appear in theſe according to the different circumſtances of the blood-letting. In caſes of rheumatiſm, I have ſeen the craſſamentum not equal to a third part of the ſerum ſurrounding it; and other caſes, where the ſerum did not ſeparate from the craſſamentum, to the amount of a fourth part of the whole maſs: and from attending to the circumſtances of the blood-letting, I have been able to foretell what, in twenty-four hours after, would be the condition of the ſeparation. But even ſuppoſing we had a more exact eſtimate of the ſerum with reſpect to the craſſamentum, or in other words, of the red globules and gluten taken together, it ſtill remains undetermined what proportion theſe two laſt mentioned matters bear to one another; and conſequently it is not yet aſcertained what is the uſual proportion of red globules in the blood of perſons in health, nor how far it may have a ſhare in producing a peculiar temperament.

With reſpect to the gluten of the blood, conſidered by itſelf, it is equally difficult to aſcertain its proportion either to the whole maſs or to the ſeveral parts of it. It ſeems to me to be determined, that the gluten, whether combined with the red globules in the craſſamentum, or ſpontaneouſly ſeparated from the other parts, is the ſame kind of matter with

that

that which is diſſolved in the ſerum. In what proportion, however, this laſt may be, is by no means accurately determined. There is reaſon to believe that the ſerum is always a ſaturated ſolution; but at the ſame time it is probable, that the ſolvent power of the ſeroſity may be greater or leſs upon different occaſions; and therefore we ſtill want experiments to aſcertain the proportion of the whole of the gluten to the reſt of the maſs. It may readily be admitted, that in healthful bodies, both the red globules and the gluten may be more or leſs, according to the quantity, and in ſome meaſure according to the quality, of the aliments taken during a given time: but this will hardly enable us to determine what is the proportion in the healthful bodies of different perſons; and conſequently what ſhare they may have in giving a difference of temperament. It may be preſumed, however, that with reſpect to the ſeroſity, the proportion of red globules and of gluten taken together, will be greater or leſs according to the force of the digeſtive and aſſimilating powers in each perſon; and that theſe again will be according to the general ſtrength or weakneſs of the ſyſtem. The proportion of the ſeveral parts of the fluids, therefore, may be different in different temperaments; but ſtill this will not of itſelf produce that difference.

It remains to conſider the third portion of our maſs of blood; and that is, the ſeroſity; with regard to which, the aſcertaining its proportional quantity is equally difficult. It muſt be equally ſo with reſpect to the aſcertaining the proportions of the craſſamentum and the ſerum; becauſe the proportion of ſeroſity may be preſumed to be the ſame with that of the ſerum: and therefore, till the latter can be more exactly aſcertained than it has yet been, we muſt endeavour to do it by conſidering thoſe cauſes which may be ſuppoſed to produce in greater or leſſer quantity the matter contained in the ſeroſity.

In attempting this, we ſhall lay aſide a conſideration that might readily preſent itſelf, and which is, that of the quantity of liquid taken into the body. This certainly does occaſionally increaſe the quantity of ſeroſity: but as I believe the excretions in healthful bodies are always increaſed according to the quantity of liquid matter preſent in the blood-veſſels; ſo I ſuppoſe that a greater quantity of liquid occaſionally taken in,

in, will ſoon paſs off by the excretions, and therefore will occaſion no ſteady difference in the proportion of ſeroſity in the healthful ſtate of different perſons.

We muſt therefore ſeek for ſome other cauſe of the difference in the proportion of ſeroſity. With this view, it appears, that the digeſtive and aſſimilating powers of the animal œconomy are fitted to prepare, from the aliments taken in, a fluid ſuited to the purpoſes of that œconomy, particularly to the nouriſhment of the ſolid parts of the body; and ſuch fluid, whilſt in a condition fit for its purpoſe, we preſume to be bland, mild, and nowiſe noxious and hurtful.

At the ſame time, it is probable that theſe ſame fluids are not long ſtationary in that condition; but in conſequence of a certain proceſs conſtantly going on, are changed into ſuch a ſtate, that if the change was to go too far, and the changed fluids at the ſame time to be retained in the body, they might prove to it extremely noxious, and even pernicious. It is the change now mentioned that we ſuppoſe to produce the ſeroſity, which, although ſuited to ſome purpoſes of the œconomy, is yet at the ſame time neceſſary to be conſtantly thrown out of it; and is therefore what affords the ordinary excretions. From this laſt circumſtance of the ſeroſity being fitted in proportion to its quantity to be thrown out by the excretions, we preſume that its proportion in the whole maſs is ſeldom for any length of time to any degree of exceſs. Still, however, its proportion may be different in different perſons; and this difference may have a ſhare in giving a difference of temperament. It may be alleged, indeed, that the animal proceſs which produces a ſeroſity may be in different degrees of force in different perſons; and conſequently, that the ſeroſity may be produced more or leſs quickly, as well as be of a more ſaline quality, in one perſon than in another: ſo that in this manner, by a difference in the quantity and in the quality of the ſeroſity, a difference of temperament may be produced. That this is poſſible, cannot be denied; but I do not know the circumſtances in which it takes place, nor the external appearances whereby it may be diſcovered.

It has indeed been commonly enough ſuppoſed, that the blood is in a more ſaline ſtate in ſome perſons than in others; and this may be the caſe, but we have no proper experiments

to

to ascertain the quantity or condition of the saline matter in the blood. It has been imagined, that the saline state of the serosity may be discovered by certain appearances on the surface of the body: but with respect to these, the conclusion is fallacious; because it can be rendered probable, that these appearances often depend more upon the state of the skin itself, than upon the state of the fluids passing through it.

Upon the whole of this inquiry into the state of the blood, with respect to its aggregation, or with respect to the state and proportion of the several parts which compose it as an aggregate, it seems not only to be uncertain how far these circumstances give a difference of temperament; but, on the contrary, it seems probable, that they never do so in any considerable degree.

Notwithstanding all this, ever since chemical reasonings have been admitted into our physiology, that is, ever since the time of PARACELSUS, physicians have considered our fluids as distinguished by the state of their chemical mixture, either in the whole of the mass of blood, or in the several parts which compose it as an heterogeneous aggregate. It is, however, in the latter view only, that is, with respect to the several parts, that we can chemically consider the subject; and here it will be readily acknowledged, that till very lately, much frivolous, hypothetical and false reasoning has prevailed in the chemical doctrines respecting the nature and state of our fluids. Even at present, physicians have hardly come to be sufficiently chaste in avoiding such hypothetical doctrines; and however confident they have been in their chemical reasonings, I am unable to find any thing either clear or certain upon the subject. Not to mention how little we have yet learned of the nature of vegetable or animal substances from their chemical analysis, it is enough to say here, that with respect to some parts of the mass of blood, it is by no means ascertained, either that their chemical mixture is upon different occasions anywise changed, or what change is produced, or in what manner such change is effected. This may be very confidently asserted with respect to the red globules; the mechanical or chemical properties of which are neither of them clearly ascertained; and we neither know how they are formed or produced, nor in what manner they may be chemically changed.

With

With reſpect to the gluten, I am diſpoſed to make the like aſſertion: for it appears to me, that we neither know how it is formed from our vegetable aliment, nor what is preciſely the ſtate of its mixture; and therefore we cannot clearly ſay *à priori*, how it may be chemically changed. I do not indeed know of any obſervations which aſcertain its being in any caſe changed in its ſenſible qualities. There are indeed caſes in which its viſcidity and force of coheſion ſeems to be conſiderably diminiſhed; but different explanations of theſe phenomena may be offered: and however they may be explained, the phenomena ſeem to take place only in more evidently morbid caſes; ſo that we have no juſt grounds for aſſerting that any ſuch difference takes place in the temperaments of different men in health. It has indeed been commonly ſuppoſed, that the denſity and viſcidity of the maſs of blood is different in different perſons even in a ſtate of health, and more certainly in the caſe of diſeaſe; and this has been imputed either to the greater proportion of gluten in the maſs, or to the greater viſcidity or force of coheſion of the gluten that is in due proportion preſent: but neither the one nor the other ſuppoſition has been aſcertained by proper experiments. Some experiments, indeed, as thoſe of Dr. Browne Langriſh, have been offered for the purpoſe; but they are evidently frivolous and fallacious.

I have ſaid above, that the proportion of gluten in the blood may be increaſed by the quantity of aliments taken in, and by the vigour of the ſyſtem in preparing and aſſimilating theſe: but it is ſufficiently probable, that the proportion of gluten will be ſuited to the vigour of the ſyſtem, and therefore produce no morbid ſtate; and although it ſhould have ſome ſhare in giving a difference of temperament, it will not do this as conſidered by itſelf, but only as accompanying the other circumſtances of more power in the ſyſtem.

I cannot diſmiſs this ſubject without obſerving, that the ſuppoſition of a preternatural ſpiſſitude of the maſs of blood, or as it may be expreſſed of a lentor, being a frequent cauſe of diſeaſe, has had a great ſhare in almoſt all the modern ſyſtems of pathology; but I allege that it has been for the moſt part hypothetical; and has hardly, ſo far as I know, in any caſe been aſcertained as a fact. I am diſpoſed to maintain, that the ſuppoſition is for the moſt part improbable. The

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functions of the œconomy, depending upon the conſtant motion of fluids through many narrow canals, require that thoſe fluids ſhould have a very great fluidity; and accordingly Nature has, for this purpoſe, provided, that a pure water ſhould always make a very great part of the animal fluids. It is alſo certain, that thoſe parts whoſe particles might be diſpoſed to unite together, and to form impermeable maſſes, are for the moſt part held in a ſtate of ſolution, and in a very fluid ſtate; or if there are certain parts which are only in a diffuſed ſtate, theſe are in very ſmall proportion to the entirely fluid parts: and while the heat and motion of the whole continue, the coheſive matters are kept in a very minutely divided ſtate, and diffuſed amongſt the more fluid parts; and there is not any evidence of their ſeparation from thoſe fluids but in conſequence of ſtagnation. There is therefore little foundation for the ſuppoſition of a preternatural ſpiſſitude prevailing in the maſs of blood, or of its proving commonly the cauſe of diſeaſe: And although what I have now ſaid be not ſuited directly to my preſent purpoſe of explaining the difference of temperament, yet it has ſome concern in it; and in an introduction to the conſideration of the operation of medicines, cannot be improper.

But to return to my ſubject: I have now endeavoured to ſhow, with reſpect to the red globules or gluten, that from the conſideration of their chemical mixture, we can obtain very little knowledge towards the diſtinction of temperaments. It may, however, be expected, that by means of chemiſtry we may obtain more from the conſideration of the ſeroſity; but how far we can go even in this matter, is to me ſtill very uncertain. It is now known very well that the ſeroſity of the human blood is a watery fluid which holds diſſolved in it, beſides a quantity of gluten, a peculiar ſalt which is hardly known, or at leaſt is not diſtinctly perceived to be in any other part of nature beſides that of animal bodies. We know alſo, from the excretions which we preſume to be afforded by the ſeroſity, that there exiſts in it alſo a quantity of oily matter; but of what particular nature that is, or in what proportion it is preſent, or in what manner it is combined with the other parts, we do not know with any preciſion; and therefore cannot ſay in what meaſure the conſideration of this oily part may ſerve to aſcertain the different ſtate of the fluids in the different bodies of men in health.

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We may, I think, neglect the conſideration of the oily part of the blood; but the ſaline part may ſeem to deſerve more attention. There is ground to believe, that beſide the peculiar ſaline matter above mentioned, there are a number of other ſaline matters preſent in the ſeroſity; but of what nature preciſely, or in what proportion, remains unknown. To give an example of this, we know now that there is in the urine of every perſon, probably derived from the ſeroſity, an acid, that upon certain occaſions gives a concretion in the urinary paſſages, and which, ſeparated from the urine, puts on the appearance of an earthy or ſtony matter. This, however, has been learned only lately from the analyſis of ſuch urinary concretions as have become a diſeaſe; and the diſcovery, while it now enables us to correct ſome parts of our ſyſtem, ſerves at the ſame time to ſhow how ignorant we were with regard to the ſtate of the human fluids.

From theſe conſiderations of the ſeveral matters which we can perceive to exiſt in the maſs of blood, it will appear that there is little ground for diſtinguiſhing the different temperaments of men by the different ſtate of their maſs of blood. It is indeed very poſſible, that a different ſtate in this reſpect may take place in different men; but to what degree, or by what external marks it may be perceived, in aſcertaining either the one or the other, phyſicians have hardly yet gone any length.

Without entering thus into the conſiderations of the different ſtates of the ſeroſity, it may be imagined there is a groſſer view, that may be taken for diſtinguiſhing the different ſtate of the fluids in different perſons.

There is in the human body, as living always in part upon vegetable aliments, a power whereby theſe aliments, after being ſome time in the body, are conſiderably changed in their nature and qualities, being changed into animal fluids; which are in ſeveral reſpects conſiderably different from the vegetable matters that were taken in. How this change is effected we do not exactly know; and the only circumſtance that tends ſomewhat towards the illuſtration of it, is, that a change of vegetable matter, nearly analogous to this which happens in the human body, is made by its being ſubjected to putrefaction: and though we cannot diſtinctly perceive in what

what portions of the fluid, more especially in what manner, or to what degree, this is carried on in the body; we may pretty safely conclude in general, that the animal process is a part of the putrefactive fermentation. At the same time we observe, that after the animal process has brought the aliments into that state which is suited to the purposes of the animal œconomy, or into the proper state of animal fluids, these are not long stationary in that condition, but are constantly advancing towards a putrid state; and that these degenerating and degenerated parts are what chiefly form the saline or earthy ingredients of the serosity, which, with a part of the fluid, are constantly passing out of the body by the several excretions.

In this view, we can perceive that the animal fluid may in its composition be more or less prone and more or less advanced towards the putrescent state; and that by these circumstances the fluids may be different in the consistence of the whole mass, or in the chemical qualities of the serosity: but till the changes in these respects have proceeded to a morbid state, we can hardly perceive them when in a lesser degree, or say how far they can, or actually have, a share in distinguishing the temperaments of men in health.

From the several remarks we have now offered respecting the serosity, it clearly enough appears, that there is a portion of the mass of blood which is always in a saline and acrid state; and nothing has been more common among physicians than to suppose that an acrimony of the fluids is a frequent cause of disease.

It is very possible that it may be so, and upon many occasions it certainly is so: but it appears to me that the supposition has been too rashly and too frequently admitted, and that it has been for the most part purely gratuitous, without any proper evidence of it in fact. The possible species of acrimony have been little understood, and several of them altogether erroneously supposed. Others of them, though possibly occurring, have not been shown really to take place in any unusual quantity; and the phenomena adduced in proof of them may be commonly explained from other causes, and

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are certainly often produced by causes of a different and even contrary nature.

With respect to the various acrimony which we have allowed to be constantly present in the serosity, it is probable, that upon different occasions it may be in greater or lesser quantity; but for this very reason of its being constantly present, we must conclude that it does not stimulate the system very strongly. This happens partly from these acrids being constantly diffused in other mild fluids, partly from the arterial system not being sensible to such a stimulus, and partly from these acrids stimulating the secretory and excretory organs to a larger excretion, whereby they are by one or other excretion immediately thrown out of the body. From these considerations, I conclude, that a spontaneous and noxious acrimony does not frequently arise; for the greatest part of mankind pass their lives without feeling any of the effects that might be imputed to it: and though there are some instances of its operation, these are very rare, and commonly in consequence of unusual and violent circumstances in which the body has been placed.

With respect to acrid matters introduced into the body from without, there is no doubt that many of these are sufficently powerful in disordering the system; but there are certainly also many thrown in that have no effect at all; for not to mention the various precautions which nature has taken to prevent their reaching the mass of blood, I think it is only necessary to observe, that even when in the mass of blood, they are rendered innocent, by their being joined with, and diffused in, the serosity, and with it soon thrown out by one or other of the excretions; so that some of the most acrid, as mercury and cantharides, show their effects only in the secretory or excretory organs.

Upon the whole of this subject, therefore, I would conclude, that the supposition of an acrimony as the cause of diseases, has been too frequently admitted in our modern pathology; and that it ought not to be admitted, unless when the causes and existence of it are well ascertained.

To conclude, I will not deny that the state of the fluids may have a share in distinguishing the different states of the body

body, both in health and in ſickneſs: but at the ſame time I muſt maintain, that we know little of the manner in which it may have this effect; that our theory of the human fluids is ſtill very incomplete and imperfect; that while in this condition it has been employed too raſhly and too largely in every part of the ſyſtem of phyſic; and that we have little temptation to do this, as it is highly probable that the ſtate of the fluids depends very much upon other circumſtances of the conſtitution, which are more fundamental, and more powerful in determining the ſeveral conditions of it.

ARTICLE III. *Of the Diſtribution of the Fluids.*

The third circumſtance by which we ſuppoſe the temperaments of men may be diſtinguiſhed, is the different ſtate of the diſtribution of the fluids, and alſo the different ſtate of the balance in this reſpect between the ſeveral parts of the ſyſtem.

It is in the firſt place evident, that it is chiefly by the action of the heart the blood is propelled into the ſeveral veſſels of the body: for although the action of the arteries contributes to promote the motion of the blood, and although upon certain occaſions the action of the arteries in particular parts may be increaſed or diminiſhed, ſo that the momentum of the blood in particular parts is promoted or abated without any change in the action of the heart; yet it is preſumed, that in the ordinary ſtate of men in health, the action of the arteries is exactly in proportion to the action of the heart in diſtending them; and therefore that we may hold the action of the arteries as given, and conſider the heart alone as the moving power.

The action of the heart, therefore, taking place, the diſtribution of the blood into the ſeveral parts of the body will be in proportion to the capacity of the veſſels, and in proportion to their denſity or reſiſtance in the ſeveral parts. Of this we have a clear example in the gradual formation of the body from its firſt beginning to its full growth; during which the parts are ſucceſſively evolved, ſome of them attaining

ſooner than others their full growth, owing, as it appears to me, to the different ſtate of the capacity and reſiſtance of the veſſels at the different periods of life; which, again, is probably determined by the ſtate of the original ſtamina.

This makes a conſiderable difference in the ſtate of man at different ages, during the gradual growth of the body; and it appears more eſpecially with reſpect to the head, which, for ſeveral purpoſes of the animal œconomy, is firſt evolved, and comes firſt to its full ſize. This certainly happens from the veſſels of the head being, in reſpect of capacity and denſity, ſuited to that end; and conſequently, in the firſt part of life, the blood is determined in a proportionally greater quantity into the veſſels of the head than into other parts of the ſyſtem: and it is ſufficiently probable, that this proportion is greater as the animal is nearer to its origin, and continues greater till the body attains its full growth; after which, however, it continually decreaſes as the animal advances to that period when it may be ſuppoſed to ceaſe.

When the body has arrived at its full growth, we very generally find a ſymmetry and exact proportion eſtabliſhed in the ſize and bulk of the ſeveral parts which fall under our obſervation; and we may then ſuppoſe the diſtribution of the blood to be ſuited exactly to that proportion. This indeed takes place with great uniformity in the moſt part of men; but I ſtill deem it poſſible, that a diſproportioned capacity in certain parts may occur in certain men, and ſubſiſt in them through the whole of life. Accordingly, it has been commonly obſerved, that men of large heads, and large in proportion to the length of their bodies, are more liable to a plethoric ſtate in the veſſels of the head, and to the diſeaſes depending upon it. I have alſo remarked in ſeveral inſtances, that men having their feet and hands ſhorter than in the uſual proportion to the reſt of the body, were more liable to a plethoric ſtate of the lungs.

This leads me to obſerve, that of the proportions of the capacities of the ſeveral parts of the body influencing the diſtribution of the blood, one of the moſt conſiderable is, the difference of the capacities of the veſſels of the lungs, and of thoſe of the ſyſtem of the aorta. It is eſpecially diſcovered by the ſize of the thorax with reſpect to the other parts of the body;

body; and this may be considered as occasioning a considerable difference in the constitutions of men. What effects it has in disposing to certain diseases, is well known to physicians.

Upon this subject of the distribution of the blood, it is particularly to be taken notice of, that there is a certain balance between the force of the heart, and the resistance of the extreme vessels by which the perspiration is thrown out. It is probable, that upon this, the state of that excretion in different persons very much depends; and which perhaps may be illustrated by this, that the resistance of the extreme vessels seems, in some cases, to be so great as to diminish the perspiration, and in consequence the appetite. Accordingly, the circumstance of men of considerable bulk, and tolerably full habit, having less appetite, and taking in less food, than others of the same bulk usually do, in my opinion may be ascribed to the weakness of the heart with respect to the extreme vessels: and, on the other hand, we find men of a moderate size, and of a lean habit, take in very largely of food; which I think must be imputed to the force of the heart being in them, great, with respect to the resistance of the extreme vessels.

With regard to the balance between the heart and extreme vessels, we cannot fail to remark, that although the interruption or diminution of perspiration is often owing to cold constricting the vessels, and increasing their resistance to the action of the heart; yet it is at the same time evident, that it frequently may be owing to the weakness of the heart not pushing the blood with due force towards the surface of the body, that this last is rendered more liable to be affected by cold. This disposition to be affected by cold may take place not only occasionally, as it may in most persons, but seemingly it subsists in some through a great part of life, and therefore may be considered as distinguishing the different conditions and temperaments of men.

Of all the differences occurring with respect to the distribution of the blood, there is none more remarkable than that of the proportion of the quantity in the arteries and veins. It is now ascertained, that this is different at different periods of life, from the difference occurring in certain

circumſtances of the arteries and veins at thoſe different periods: for it is now known, that the coats of the veins have a greater proportional denſity in young animals than in old; and therefore the reſiſtance being greater in the veins at the one period than the other, leſs blood will be received into the veins, and more will be retained in the arteries. This difference of the quantities of blood in the arteries and veins manifeſtly occurs in the ordinary progreſs of life: but it is alſo probable, that in ſome perſons the ſame difference, to a certain degree, takes place through the whole courſe of life, and gives a conſtant and conſiderable difference in the temperaments of men, as I ſhall mention more fully hereafter.

ARTICLE IV. *Of the different Proportion of Solid and Fluid in the Body.*

A fourth circumſtance producing a difference of temperament, is the different proportion of ſolid and fluid in different perſons. That this proportion varies at different periods of life; that in young perſons the ſolids are leſs denſe and the number of veſſels is greater; and that conſequently the proportion of fluid to ſolid is greater in young perſons than in old, there can be no doubt; while, on the other hand, the quantity of ſolid is conſtantly increaſing, and the number of veſſels diminiſhing through the further courſe of life; ſo that theſe circumſtances in old age are all of them entirely reverſed. Theſe conditions, therefore, are ever varying in the progreſs of life, and at the different periods of it, may be ſuppoſed to be ſuited to the œconomy: but, at the ſame time, there are circumſtances which vary this matter independent of age.

In the firſt place, as we have already remarked that the denſity of the ſimple ſolid is determined by the ſtate of the original ſtamina, ſo the conditions of the ſyſtem by which the change we have mentioned is produced, may be ſuppoſed in ſome meaſure to be determined by the ſame circumſtance. In conſequence of this, the ſolids throughout the whole of life may be more denſe in proportion to the ſize of the veſſels; ſo that the proportion of fluid to ſolid, may be different in different

different perſons of the ſame age, and in this reſpect, throughout the whole of life give a difference in the temperaments of men.

In examining this ſubject, it is neceſſary not only to take into view the quantity of ſolid and fluid compared together on the whole, but to conſider alſo the manner in which they are applied to one another. As the ſolids are formed into hollow tubes or veſſels, through which the fluids are in conſtant motion, we muſt conſider to what degree the veſſels are filled by the fluids moving through them.

In this view, it is evident that by the blood moving more ſlowly as it recedes farther from the heart, the veſſels containing the red blood are conſtantly ſtretched or diſtended in every dimenſion beyond the ſize they would aſſume if no ſtretching power was applied to them; and this is what may be called a plethoric ſtate of the ſyſtem. Such a ſtate is neceſſary not only to the evolution of the ſyſtem, and conſequently during the growth of the body, but throughout the whole of life it is requiſite to the action of the veſſels and to the due tenſion and action of perhaps every fibre of the ſyſtem. This, however, may be different in different perſons at the ſame period of life; ſo that the veſſels may be ſtretched more or leſs beyond their natural capacities. In infancy, the ſolids are lax and yielding, and the veſſels can bear to be ſtretched more than they commonly are: but as from that period the denſity and reſiſtance of the ſolids are perpetually increaſing, ſo the tenſion of the arterial ſyſtem is conſtantly approaching more and more to what it is able to bear, till at length the force of the heart can no longer extend the arteries at all, and a greater quantity of blood is thrown into the veins. In this condition matters remain through the reſt of life; but at the ſame time both kinds of veſſels remain in a plethoric ſtate.

From this view of the ſubject, it will appear that the human body, for the purpoſes of health and the proper exerciſe of its functions, is conſtantly in a plethoric ſtate; but it is ſtill ſuppoſed, that upon occaſions it may be more or leſs ſo, and may be to ſuch an exceſs as to produce either a diſeaſe, or at leaſt a ſtrong tendency to diſeaſe. Indeed it is poſſible, that throughout the whole of life, the quantity

tity of blood, and consequently the fulness and tension of the vessels, may in some persons be in a greater proportion than in others, and thereby have a share in distinguishing the temperaments of different men.

This last supposition has been universally admitted, and probably is well founded, although I find it difficult to determine certainly when it does really take place. It may perhaps in general be determined by the fulness of the pulse, the apparent size of the vessels on the surface of the body, the ruddiness of the complexion, and the general succulency of the habit. With respect, however, to the latter circumstance, we are apt to be deceived by our not being able in many cases to discern whether the plumpness of the body is owing to the fulness of the blood-vessels, or to the quantity of oil in the adipose membrane. The causes of both are very much the same; and it is only when the fulness of the habit takes place to a considerable degree, that we can with any certainty ascribe it to obesity, rather than to plethora or a fulness of the blood-vessels.

This necessarily leads me to take notice of the different state of the adipose membrane, as giving a considerable difference in the constitutions of men. The different states of the adipose membrane are for the most part abundantly obvious; and the effects of obesity are often sufficiently observable: but upon what internal state of the body, or upon what modification of the œconomy, it always depends, is not easily to be ascertained. It may be supposed in general to depend upon the quantity of nourishment, and in particular upon the oily quality of the aliment taken into the body; but although it certainly does often, *cæteris paribus*, depend upon these, yet at the same time we are certain it does not always depend upon these alone, and that in producing it many other circumstances may concur.

It seems to me very possible, that the aliment being given, the digestive and assimilating powers may often produce fluids more or less disposed to admit of a more or less ready separation of oil, and consequently of its secession into the adipose membrane; or that, on the contrary, the same powers may produce fluids in a more saline state, and in which the oily parts are mixed in such a manner as to render them more

more ready to pass off by the excretions. It is well known, that an active circulation which powerfully supports the excretions, is also powerful in preventing the accumulation of oil in the adipose membrane, and that this indeed happens in many persons without any assistance of bodily exercise; but we know also, that this accumulation of oil is especially prevented in those who take a great deal of such exercise; because this not only supports and promotes the excretions, but gives occasion likewise to the constant absorption of the oil which had been before deposited in the adipose membrane.

Whether a condition in the mass of blood disposing it to produce a copious serosity, may not be a means of increasing the absorption of oil for the purpose of involving an increased acrimony, I cannot positively determine; but this seems to be very probable, because we find emaciation to be the consequence of a morbid acrimony prevailing in the fluids, as is evident in the cases of scurvy, syphilis, and cancer.

To all these causes increasing or diminishing the fulness of oil in the adipose membrane, and which, in the cases of obesity or leanness, may allow us in general to judge of the state of the system, and in particular of the state of the fluids, we must add a consideration which relates to the function of particular parts. The secretion of oil does not seem to me to be yet clearly explained: but in general it may be supposed to depend upon a peculiar organization in the secretory organ, or in the cellular texture receiving it; because it manifestly takes place in some parts of the body more than in others. For example, it takes place in the omentum more than in the mesentery; and it is often found in preternatural quantity, or in greater proportion, in certain parts than in others: so that we must suppose it to be occasioned by some peculiar circumstances of those parts; and may therefore presume, that in the organs concerned in this business over the whole body, there is a peculiar constitution which, independent of all the others we have mentioned, has a great share in giving that state of obesity or of leanness which often marks a difference in the temperaments of men. At the same time, the cause of this is not yet well explained.

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Before concluding this ſubject, it may be proper to obſerve, that although a plethora or the fulneſs of the blood veſſels, and obeſity or fulneſs of the adipoſe membrane, are very different circumſtances, yet it is probable, that the fulneſs of the adipoſe membrane does always compreſs and diminiſh the ſize of the blood-veſſels, and gives a plethora *ad ſpatium*, which has often the effects of the plethora *ad volumen*: and I have frequently remarked, that while perſons of a fat habit may require evacuations of blood, yet at the ſame time they bear them worſe than perſons of a lean habit do.

ARTICLE V. *Of the State of the Nervous Power.*

A fifth circumſtance that may ſerve to diſtinguiſh the different temperaments of men, is the different ſtate of the nervous power. As we have already ſaid, that the motions of the human body very generally begin in the motions of this power, and that the motions which commonly follow it, depend upon the exiſtence and ſtate of the ſame power in the other parts of the ſyſtem; ſo this power may be conſidered as the prime mover in the animal œconomy; and therefore the different ſtates of it muſt unqueſtionably have a chief ſhare in diſtinguiſhing the temperaments of different men.

Its effects, however, in this reſpect, have, till very lately, been very little taken notice of. The general doctrine of the temperaments, as depending upon the ſtate of the moving powers, has indeed been delivered by ſeveral writers; but there are none of them who have proſecuted their inquiries ſo far as to aſcertain thoſe different ſtates of the moving powers which may eſpecially produce the difference of temperaments. I ſhall now attempt this ſubject; but, fully aware of the difficulties that attend it, I ſhall ſuggeſt what I have to offer with a great deal of diffidence.

The different ſtates of the nervous ſyſtem may, I think, be referred to three heads; according to the different ſtate of its Senſibility, its Irritability, and its Strength.

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As the motions of the nervous ſyſtem are moſt commonly excited by bodies acting upon the ſentient parts; ſo I ſhall begin with conſidering the ſenſibility of the ſyſtem.

Of Senſibility.

We have before defined ſenſibility to be that condition of the living body, whereby it is capable of being affected in a peculiar manner by the impulſe of other bodies on certain parts of its nervous ſyſtem; and which are therefore properly named its Sentient parts.

The extent of theſe ſentient parts, although perhaps it may not be yet entirely, is, however, pretty fully, aſcertained; and that in general the ſentient parts are the nerves, and every part into the compoſition of which nerves enter, ſo as to be expoſed to the impulſe of other bodies. We are not, however, concerned here in any diſpute upon this ſubject; having to conſider only the degree of ſenſibility that may be in common to the whole of the ſentient parts, and how far that may be conſtantly different in different perſons.

In conſidering this, we can perceive pretty clearly that the ſenſibility of perſons is different at the different periods of life; and that it may be occaſionally varied by the temperature of heat and cold applied, by the application of ſtimulant or narcotic powers, by the ſtate of ſleep and watching, and by ſome other conditions of the body. All theſe cauſes occaſionally changing the ſtate of ſenſibility, may deſerve much attention in pathology; but I omit them here, and inquire only after thoſe permanent ſtates that may give a different degree of ſenſibility to different men at the ſame period of life, and modify the operation of occaſional cauſes throughout the whole of it.

In this inquiry, I ſhall conſider ſenſibility as it may depend either upon the ſtate of the ſentient extremities, or upon the ſtate of the ſenſorium.

With

With reſpect to the firſt: In ſo far as theſe extremities are the organs of peculiar ſenſe, their ſenſibility may appear different according to the different ſtate of the organ conveying and tranſmitting the impulſes of external bodies to the proper ſentient medullary extremities; and in this way the ſenſibility of different organs may be very different in the ſame perſon: but theſe differences we at preſent neglect, and inquire only into the different ſtates of ſenſibility in the proper ſentient medullary extremities, which may be in common to the whole of the ſentient parts of the ſame perſon, but may be different in different men.

This difference may, I think, depend either upon the different mobility of the nervous power, or upon the different degree of tenſion in the nervous extremities.

I here preſume with ſome confidence, that the motions occurring in the nervous ſyſtem are the motions of a ſubtile elaſtic fluid ſomehow connected with their medullary ſubſtance; and I ſuppoſe that this fluid may have its denſity and elaſticity in a certain proportion to one another, but this varying in different perſons, and in the ſame perſon at different periods of life. From hence it will follow, that as the elaſticity is greater with reſpect to the denſity, the mobility of the fluid will be greater, and the body in which it takes place will have a greater degree of ſenſibility; and, on the contrary, that a leſſer ſenſibility will reſult from a greater denſity with reſpect to the elaſticity.

That ſuch a difference in the proportions of elaſticity and denſity does actually take place, may be readily concluded from what happens in the courſe of life, where we can diſtinctly perceive that the ſenſibility is gradually diminiſhing as the denſity of the ſimple ſolid is increaſing: and if, as we have ſaid above, the original ſtamina give a different ſtate of the denſity of the ſimple ſolid in different perſons, and that proportionally through the whole of life, we ſhall have no difficulty in ſuppoſing that the ſame circumſtance will give a difference in the proportional denſity and elaſticity of the nervous fluid, and therefore a difference of its ſenſibility. It is much in illuſtration of all this, that the ſenſibility is evidently leſs, according as the ſtrength of the ſyſtem following the denſity of the ſimple ſolid is greater

in

in different perſons, as well as at the differents periods of life.

The difference of ſenſibility may therefore depend upon the different condition of the nervous fluid inherent in the medullary ſubſtance: and that it is liable to be in ſuch different conditions, we learn from the different cauſes of the difference of ſenſibility mentioned above; ſome of which, ſuch as narcotic powers, or heat and cold, affect the ſenſibility of the nerves, even when entirely removed from all connection with the other parts of the ſyſtem.

A ſecond circumſtance determining the ſtate of ſenſibility, ſeems to be the degree of tenſion that is given to the extremities of the medullary fibres in all the ſeveral organs of ſenſe. To explain this, I ſuppoſe that the motion of the nervous fluid is an oſcillatory motion in an elaſtic fluid, and that the moſt part of impreſſions made upon the organs of ſenſe are made by the impulſes of the oſcillatory motions of other elaſtic fluids; and if all this be juſt, it will be evident that the motions excited in the nerves by impulſes upon their extremities, will be more or leſs conſiderable according as theſe extremities are under a greater or leſſer degree of tenſion. For giving this neceſſary tenſion, nature ſeems to have provided, by diſtributing a very copious ramification of blood-veſſels among the medullary fibres that are properly the ſenſorium in every organ of ſenſe. It is no where more remarkable than in the retina of the eye; and that the tenſion of the blood-veſſels muſt give a tenſion to the medullary fibres thus intermixed and coherent with them, is ſufficiently probable. That the increaſed tenſion of the blood-veſſels has an effect in increaſing the ſenſibility of the eye, is well known from many caſes of ophthalmia, or, as I may otherwiſe expreſs it, in the caſes of afflux of blood into the veſſels of the eye; in which the ſenſibility of the retina is increaſed to a prodigious degree. The increaſed ſenſibility both of the eye and ear that commonly attends phrenitis, is readily explained in the ſame manner; and ſome other illuſtrations might be given to the ſame purpoſe.

I had a caſe in which the feeling of a hand was loſt: and it was afterwards clearly perceived, that the loſs of feeling was

was owing to a palſy of the brachial artery, whoſe pulſations gradually ceaſed from the wriſt to the arm-pit; whence I judged, that the loſs of feeling was to be imputed to the want of blood and tenſion in the papillæ of the ſkin, into each of which we know a branch of an artery enters.

It will appear, therefore, that the ſenſibility of the extremities of the nerves depends in ſome meaſure on the degree of tenſion given to them by the blood-veſſels conſtantly intermixed with them: and as we have ſaid, that the conſtitutions of men are different by the difference of their plethoric ſtate; ſo the difference of their ſenſibility may be merely on this account greater or leſs.

It has been already obſerved, that the conſtitution of the nervous fluid correſponds in ſome meaſure with the other marks of ſtrength or weakneſs in the ſyſtem; and this I ſuppoſe to take place in every perſon through the whole of life, and therefore to afford a proof of its depending on the ſtate of denſity in the nervous fluid.

Before diſmiſſing the ſubject, I think it neceſſary to explain a caſe of occaſionally increaſed ſenſibility that may occur in any perſon or at any period of life. It is the increaſe of ſenſibility on occaſion of any unuſual increaſe of debility. In order to account for this, we ſuppoſe the whole of the nerves, or the whole of the medullary ſubſtance of the nervous ſyſtem, to be every where pervaded with the ſubtile elaſtic fluid above mentioned; and that this elaſtic fluid will always bring its ſeveral parts to a balance with one another, ſo as to become of the ſame denſity in every part. At the ſame time it is highly probable, that in the brain, as being the principal ſeat of this ſyſtem, and to which all the other parts are in ſome meaſure united, there is a common centre of motion and power; from whence, in conſequence of certain circumſtances, the nervous fluid is determined with greater force, and perhaps in larger quantity, into ſome parts than into others. This is what I would term the Action or Energy of the Brain; and it is particularly evident in the operations of the nervous power in the caſe of voluntary motions. It is moſt probably a certain degree of this energy which conſtantly ſupports the fulneſs in every part of the nervous ſyſtem; and it is alſo pretty plainly this which

which ſupports the inherent power in the moving fibres. Indeed it is equally probable, that the ſame energy ſupports the fulneſs and denſity of the nervous fluid in the ſentient extremities. And from all this, it appears to me that we may readily underſtand why the weakened energy of the brain, as not ſupporting the uſual denſity in the ſentient extremities, ſhould produce a greater degree of mobility, and conſequently of ſenſibility.

It is in this manner I would endeavour to account for the increaſed ſenſibility accompanying ſo many caſes of debility: but it is to be obſerved, that in certain caſes this weakening of the denſity of the nervous fluid in the ſentient extremities may go to exceſs, and deſtroy ſenſibility and ſenſe altogether.

This doctrine of the energy of the brain being, in a ſtate of health, conſtantly extended every where to the ſentient as well as to the moving extremities of the nerves, may be illuſtrated from remarking, that when, upon any occaſion, the energy of the brain is gradually failing, the effects of this every where appear from the loſs of ſenſe and motion, happening firſt in the parts moſt diſtant from the brain, while they are found to ſubſiſt longer in thoſe parts which are nearer to it.

We have thus conſidered the ſtate of ſenſibility as depending upon the ſtate of the ſentient extremities: but I have mentioned that it may alſo depend upon the ſtate of the ſenſorium commune; and which, therefore, now requires our attention.

Before entering particularly upon this, it may be ſtated as a queſtion, Whether the ſtate of the nervous cords tranſmitting motions from the extremities to the ſenſorium, may not affect the ſenſibility of the ſyſtem? And on this ſubject it might be ſuppoſed, that the ſtate of the membranes inveloping the nervous fibres in their courſe, as well as the ſtate of the cellular texture and blood-veſſels laid in theſe invelopements, and ſeemingly every where interpoſed between the ſeveral nervous cords, ſhould, according to the different circumſtances of theſe interpoſed parts, render the conveyance of the motions of the nervous fluid from the extremities to the

the ſenſorium more or leſs free and forcible. It is indeed ſufficiently probable, that the ſtate of theſe circumſtances may have effects in this matter; but we hardly know the caſes in which they operate, and ſtill leſs how far theſe circumſtances are permanently different in different men.

Suppoſing, however, the motions propagated from the extremities to the ſenſorium to be quite unaffected in the courſe of the nerves, our queſtion then muſt be, How far the effects of theſe motions in producing a ſenſation are affected by the ſtate of the ſenſorium itſelf? With regard to this queſtion, it may, in the firſt place, be preſumed that the conſtitution of the nervous fluid, with reſpect to denſity and elaſticity, will be the ſame in the ſenſorium as in the extremities; and therefore, ſo far as it depends upon this conſtitution, the ſenſibility will be of the ſame degree in the one as in the other. It is likewiſe equally probable, that a certain degree of tenſion in the medullary ſubſtance of the brain given to it by the fulneſs of the blood-veſſels there, will alſo have the ſame effects on ſenſibility as I have alleged in the caſe of the extremities.

As, however, the ſtate of tenſion in the veſſels of the brain may, upon certain occaſions, be greater than in the ſentient extremities of the nerves; ſo this ſtate of the ſenſorium may be a cauſe of greater ſenſibility, while the force of the motions propagated from the ſentient extremities remain the ſame as before.

Nothing indeed is more evident than that the energy of the brain, that is, its action in determining the nervous power into the reſt of the ſyſtem, depends very much upon the fulneſs and tenſion of its blood-veſſels; and it is therefore to me probable, that the degree of ſenſibility in the ſenſorium will in ſome meaſure depend upon the ſame circumſtance. It may perhaps be ſtarted as an objection to this, that a certain exceſs of fulneſs in the blood-veſſels of the brain, ſeems to have the effect of deſtroying ſenſe altogether; and that any preternatural fulneſs might have, in ſome meaſure, the effect of impairing the ſenſibility of the ſenſorium. The firſt part of this is indeed true; and I dare not aſſert that a certain degree of fulneſs may not render the motions of the nervous

nervous power leſs free, and thereby impair the ſenſibility of the ſenſorium: But ſtill this will not deſtroy the opinion otherwiſe ſo well ſupported, that while the motion of the nervous power remains in a certain meaſure free, a certain degree of fulneſs is neceſſary to the energy of the brain, and therefore that a certain degree of it may increaſe ſenſibility.

We have thus found, that ſenſibility, ſo far as it depends upon the conſtitution of the nerves and nervous fluid, will be the ſame in the ſenſorium as in the ſentient extremities. We have likewiſe found, that an increaſe of the ſenſibility of the ſyſtem may ariſe from an increaſe of tenſion in the blood-veſſels of the brain, as manifeſtly happens in the caſe of phrenitis and ſome other diſeaſes: and there is yet to be mentioned a ſtate of the ſenſorium, which, in another reſpect, affects the ſenſibility of the ſyſtem.

Every body knows that the moſt part of ſenſations ariſing in the ſenſorium are accompanied with what is called a Reflex Senſation, that is, a ſenſe of agreeable or diſagreeable in the ſimple ſenſation; and the circumſtances of this have a great ſhare in determining the effects of the ſenſation upon the ſyſtem. This I take to be entirely a function of the ſenſorium, which, according to its different conditions, is fitted to increaſe or diminiſh the ſtate of reflex ſenſation. That the condition of the ſenſorium is upon different occaſions different in the ſame perſon, is ſufficiently obvious; and it appears to me no leſs obvious, that however it may be varied on different occaſions, there is a character or tone in theſe reſpects runs throughout the whole of life, and is a circumſtance very much diſtinguiſhing the different temperaments of men. It is indeed difficult to aſcertain the condition of the ſenſorium that diſpoſes it to have agreeable or diſagreeable ſenſations more or leſs readily, or in different degrees excited in it; but though this cannot be done, yet it is very proper to mention it as modifying the ſenſibility of the ſyſtem, and therefore of great influence in the pathology of phyſic, and in diſtinguiſhing the moral characters of men.

Having now treated of the ſenſibility of the nervous ſyſtem, I ſhall proceed, in the next place, to conſider its irritability;

tability; which may have a great ſhare in diſtinguiſhing the temperaments of men.

The general idea of irritability has been already mentioned; and we have likewiſe obſerved, that this property belongs only to certain fibres of a peculiar ſtructure and conformation fitting them for this purpoſe.

Of Irritability.

In what I am to offer upon this ſubject, I abſtract entirely from the force with which the contractions of moving fibres may be performed, which by ſome may be comprehended under the title of Irritability: but at preſent I conſider only the readineſs or facility with which the contractions of moving fibres are excited. It is very probable that certain circumſtances of this conformation may be ſo different in different caſes, as to give different degrees of irritability; but both of the general ſtructure, and of the varieties of it which may occur in particular caſes, I am entirely ignorant.

Our late phyſiologiſts have ſuppoſed that there is a degree of greater irritability in certain muſcles and moving fibres than in others; and particularly, that it is greater in thoſe of the heart, the alimentary canal, and diaphragm, than in thoſe of the other parts of the body. But whether this be owing to any peculiarity in the ſtructure of the fibres in thoſe more irritable parts, or merely to the power of habit, which by repetition ſeems to give a greater irritability to every fibre of the ſyſtem, may be juſtly a queſtion. It does not appear to me that we have evidence of any peculiar ſtructure in the fibres of the heart, or other ſuppoſed more irritable parts; and at the ſame time, as we know them to be moſt conſtantly under the moſt frequent repetition of their contractions, I am perſuaded that their ſeemingly greater irritability, or rather the perſiſtency of their irritability, is owing entirely to the power of habit.

Preſuming, therefore, that we do not know the circumſtances of the moving fibres themſelves, which might give them in certain caſes a greater degree of irritability, we muſt ſeek for the cauſes of this in ſome general circumſtances of the

the ſyſtem. On this ſubject, the moſt obvious conjecture is, that the irritability of the moving fibres depends upon the ſame cauſes with the ſenſibility of the ſyſtem. Many obſervations prove that theſe two qualities or conditions are commonly in the ſame degree in many perſons; and it is probable that the leſſer denſity of the nervous power, which renders it more moveable in the organs of ſenſe, may alſo render it ſuch in the organs of motion. It ſeems to happen accordingly in young perſons, in the female ſex, and in all perſons naturally or occaſionally weak.

This leads to the ſuppoſition that irritability and ſenſibility are in the ſame degree, and depend upon the like cauſes in every perſon: and as the contractions of moving fibres produced ſeem to be commonly in proportion to the irritation applied, which is ſo often a certain ſenſation; ſo it might be ſuppoſed that a general irritability being given, the ſtate of it with regard to particular contractions might be neglected, and theſe contractions be referred entirely to the ſtate of ſenſibility.

This certainly may be judged to be often the caſe: but it appears to me that we muſt not ſuppoſe it in all caſes; becauſe it ſeems evident that ſenſibility and irritability are not always in the ſame condition in the ſame perſon. I conclude this from obſerving that theſe two qualities are often under different laws. With reſpect to ſenſibility, it is well known that the force of impreſſions in exciting ſenſation is by repetition conſtantly diminiſhed; whereas, by a like repetition of motions, the readineſs with which theſe motions are repeated, or what may be called the irritability of the parts, is as conſtantly increaſed. Thus, in certain caſes where motions are frequently repeated by the application of the ſame impreſſion, ſometimes the one of the laws mentioned takes place and ſometimes the other; ſo that ſometimes to produce a repetition of the ſame motion, the force of the impreſſion employed muſt be conſtantly increaſed; and in other caſes the motion may be repeated though the force of the impreſſion be conſtantly diminiſhed. Theſe are caſes with which phyſicians are well acquainted; but in what circumſtances the one or the other law takes place, I cannot certainly determine.

However that may be, the whole of these phenomena seem to me to show, that the sensibility and irritability, either in the whole of the system or in particular parts of it, may, on certain occasions, be in different conditions; and of what extent this consideration is in the animal œconomy, must be well known to every person who has studied the powers of habit.

Besides these causes of a difference of irritability, another condition may be mentioned in which the irritability is affected by other circumstances than the general state of the nervous system; and therefore may be independent of the state of sensibility in the same person. Although we cannot assign the state of the muscular fibre itself which gives it its peculiar state of irritability; yet in the whole of a muscle, and perhaps in every collection of moving fibres, there seems to be a circumstance which has a considerable effect.

We plainly perceive, that a certain degree of tension in its fibres, is necessary to the proper action of every muscle; or at least it will be readily allowed, that a certain tension is necessary to produce the vigorous action of any of these organs: and physiologists have observed the means employed both by nature and art to give this necessary tension. Besides the extension of muscles in their whole length, which in many cases may be more or less, it appears to be also necessary that every particular proportion of their fibres should be kept in some measure in an extended state. This I suppose to be done by means of arteries being every where intermixed with the moving fibres, in such a manner as to lie across the length of these fibres, and thereby necessarily, by their constant fulness and occasional distension, extend to the fibres that pass over them.

The theories which were formerly offered to explain the purpose of nature in intermixing so many blood-vessels with the moving fibres, are now generally exploded; and the only theory which seems to be at present tenable, is, that it is the purpose of nature to give thereby heat and tension to the moving fibres. This provision of nature is necessary upon the footing I have just now endeavoured to point out; and it will at the same time appear probable, that a certain degree of tension

ſion will not only give vigour, but alſo a greater degree of irritability to muſcular fibres; ſo that the greater or leſs fulneſs of the arteries may give a ſtate of irritability independent of the ſtate of ſenſibility in the ſyſtem; as ſeems evidently to take place in all thoſe caſes of plethora which we can diſtinguiſh from obeſity.

Having thus conſidered irritability as properly reſiding in the moving fibres or living ſolids alone, and having conſidered its various ſtates in theſe, I judge it neceſſary now to take a larger view of the ſubject, and, under the term Irritability, to comprehend the ſtate of thoſe motions which, beginning in the ſenſorium, are directed from thence along the nerves to the ſeveral moving fibres, and are very generally the beginning of all the motions which take place in the muſcular or moving fibres of the body. The degree of facility or readineſs, more or leſs, with which theſe motions beginning in the ſenſorium are excited, I would term the Irritability of the Brain or Senſorium; and this we are now to conſider farther.

This beginning of motion in the ſenſorium is moſt remarkable in thoſe caſes in which it is accompanied with, or appears to be excited by, volition. Except, indeed, in thoſe caſes, phyſiologiſts have commonly conſidered the brain as an inert and paſſive organ, having no motions taking place in it, but in proportion to the impulſes proceeding from the ſentient portions of the nerves, and the ſenſations ariſing from thence. I am, however, diſpoſed to believe, that in conſequence of the impulſes very conſtantly proceeding from the ſentient portions of the nerves, and even independent of any ſenſation ariſing at the ſame time, there is a new power and force of motion excited in the brain, and from thence very conſtantly directed into every part of the nervous ſyſtem. This is what I have called the Energy of the Brain; and have alleged, that not only in conſequence of ſenſation and volition, but, without either of theſe, in conſequence of certain other impulſes, this energy is manifeſtly exerted, and excites, with more or leſs force, the contractions of moving fibres; and farther, that from the impulſes very conſtantly proceeding from the ſentient parts, though producing neither ſenſation nor volition, the ſame energy is excited and exerted ſo as to ſupport the fulneſs both of the ſentient

nerves and of the inherent power of the moving fibres. From all this it will be underſtood, that under the title of the Irritability of the Brain, I comprehend the greater or leſſer degree of readineſs with which the energy of the brain is exerted in all its various operations upon the moving fibres.

Having thus explained my idea of the irritability of the brain, I proceed to conſider its various ſtates: and, in the firſt place, in thoſe caſes in which the beginning of the motion is either accompanied with, or is produced by, volition; which are always the caſes moſt diſtinctly obſervable.

Volition ariſes in two ways: Firſt, when ſenſations ariſing either without, or with very little, reflex ſenſation, give occaſion to the exerciſe of the judgment in marking their various relations, and their conſequent fitneſs or unfitneſs for human affairs, they thereby give occaſion to various deſires, and therefore to volitions for producing thoſe motions of the body that are ſuited to the ends deſired. Theſe volitions may be more or leſs powerfully excited, according to the operation of the intellectual powers in marking the fitneſs or unfitneſs of things: and a different ſtate of theſe powers, and a quicker or ſlower perception of relations, certainly diſtinguiſhes the temperaments of men. We know little, however, of the phyſical cauſes of this; and it is ſeldom that the difference of the intellectual powers gives ſuch a difference of temperament as may particularly affect the phyſical ſtate of the human body, and thereby the operation of medicines. We therefore omit the further conſideration of the irritability that may take place in the volitions ariſing from intellectual operations; and this the more eſpecially, becauſe I believe it is never diſcernible excepting when the intellectual concluſion excites a conſiderable degree of reflex ſenſation; and when, therefore, the irritability is in the ſame condition with that we are now to mention in the ſecond place.

A ſecond caſe of volition excited, and exciting, is, when the ſenſations, either altogether without, or with very little, intellectual operation attending them, produce theſe various modes of volition which we diſtinguiſh by the names of Appetite, Propenſities, and Emotions or Paſſions. With reſpect to the two firſt, we believe that the volition and the motions

motions produced by it are always exactly in proportion to the ſtimulus applied to the particular parts, from which the propenſity or appetite ariſes; and I cannot clearly perceive that, in modifying this, the irritability of the brain has any ſhare.

It is only in the caſe of emotions or paſſions, that is, the modes of deſire and averſion of the ſtronger kinds, that we can ſuſpect a different degree of the irritability of the ſenſorium to take place. Mankind very generally ſuppoſe in different men a different degree of irritability in this reſpect: and as the whole of the motions here concerned are in the ſenſorium itſelf, the irritability muſt likewiſe be eſpecially there. I entertain indeed no doubt that ſuch an irritability takes place; but ſo far, however, as I can perceive, ſuch irritability muſt depend upon the ſame cauſes as the ſenſibility of the ſenſorium with reſpect to the production of reflex ſenſations. To this purpoſe, we muſt remark, that in proportion as ſenſations are agreeable or diſagreeable, they muſt excite deſire or averſion in different degrees; and therefore the irritability of the brain in proportion to theſe; and as it depends upon the ſame cauſes, ſo it muſt be exactly in proportion to the ſenſibility in producing reflex ſenſations. The whole, however, is involved in the ſame obſcurity and difficulty as the peculiar caſe of the ſenſibility of the ſenſorium; ſo that I ſhall proſecute the conſideration of it no further here; although we cannot altogether quit the ſubject without taking notice of a curious queſtion that occurs reſpecting it.

It has been already obſerved, that ſenſibility and irritability do in ſome reſpects follow different laws, while by repetition, the former is diminiſhed and the latter is increaſed. We have alſo ſaid, that there may be a different condition of theſe two faculties, ſo that there may be an increaſe of irritability independent of ſenſibility; and if this is manifeſt in particular organs, it may alſo be ſuppoſed to take place in the ſenſorium. I think it truly does ſo; and that upon many occaſions the irritability of the brain, is independent of its ſenſibility with reſpect to reflex ſenſation.

Of Strength and Weakneſs.

Another circumſtance of the nervous ſyſtem meriting attention, as diſtinguiſhing the temperaments of men, is the ſtrength of the body, always, in my opinion, depending on the ſtate of the nervous ſyſtem. The ſtrength of the body appears always to conſiſt in the force of contraction of the muſcular or moving fibres. Theſe, in the living body, are conſtantly poſſeſſed of a *vis inſita*, or *inherent power*, by which they have a continual tendency to contract and diminiſh their length; and the force of this power in different perſons, may be conſidered as giving more or leſs of ſtrength to the ſyſtem. It may be difficult to ſay what this depends upon, although probably it depends upon the circumſtance of the muſcular fibre, ſo much connected with the other parts of the nervous ſyſtem, being fitted to receive and retain a large portion of the nervous fluid, which, as an elaſtic, muſt have a continual tendency to contract itſelf, and the fibre in which it is inherent; and the force of this contraction will probably be according to the denſity of the fluid which gives the inherent power. If am right in ſuppoſing the ſtate of the ſimple ſolid to modify the ſtate of the medullary fibre, this laſt will contain a denſer fluid; as we commonly find the inherent power in the medullary muſcular fibre to correſpond with the denſer ſtate of the ſimple ſolid.

This ſtrength of the inherent power, therefore, is one foundation for the ſtrength of the ſyſtem; but the contraction of muſcular fibres does commonly, perhaps always, depend upon a *vis nervea* derived from the brain. This is eſpecially evident in all the caſes of voluntary motion; which being always an action of the brain, there ſeems to be a motion excited there, that is determined with more force, and perhaps in greater quantity, along the nerves into the muſcular fibres. In theſe caſes of voluntary motions, the force with which this power is exerted is regulated by the will, and therefore in various degrees, but cannot be exerted with the ſame degree of force in every different perſon; and thoſe in which it can be exerted with greater force than in others, are conſidered as the ſtronger perſons.

Upon

Upon this ſubject it may be fairly concluded, that the ſtrength will always depend upon the force with which the energy of the brain can be exerted; for although that may, according to the will, be in very various degrees of force, it may be ſuppoſed that a volition being given, the energy of the brain may be more ſtrongly exerted in one perſon than in another; and therefore the ſtate of this energy, with the ſtate of the inherent power, will determine the ſtrength of every ſyſtem: or, as I think it may be ſhown that the ſtate of the inherent power depends alſo upon the energy of the brain; ſo this alone may be conſidered as determining the ſtrength of every ſyſtem.

The queſtion, however, upon this ariſing, is, What gives a ſtronger energy of the brain in one perſon than in another? The anſwer is, that it probably depends upon the ſtate of the medullary fibre containing a nervous fluid of greater denſity in one perſon than in another. Indeed it is rendered very probable by this, that in certain diſeaſes of the brain, as in mania, the ſtrength of the ſyſtem is commonly increaſed to an uncommon degree; while at the ſame time we find a great change to have happened in the medullary ſubſtance of the brain, by its becoming of a more denſe ſubſtance than uſual.

Having thus explained the cauſe of ſtrength in general, it is neceſſary further to explain how, agreeable to theſe principles, the ſtate of ſtrength comes to differ in a conſiderable degree at the different periods of life.

That from the beginning of life to a certain period, the ſtrength of the body ſhould be conſtantly increaſing, will be readily explained by the increaſing denſity of the ſimple ſolid, and with that the denſity of the nervous fluid in the medullary fibre.

This, however, has its limited period; for although the denſity of the ſolid is ſtill conſiderable, and even going on to increaſe, yet the ſtrength of the ſyſtem does not increaſe beyond a certain degree; and, on the contrary, is from a certain period conſtantly declining.

This remains to be explained; and may be attempted in the following manner. We have ſaid that the nervous fluid has

has the properties of elaſticity and denſity combined in a certain proportion; but that this proportion is conſtantly varying in the courſe of life. In the beginning, the elaſticity is great in proportion to the denſity; but while the cauſe of any increaſe of elaſticity is not known, the increaſe of denſity, from what we have ſaid before, is evident and certain; and accordingly with that the ſtrength of the ſyſtem is conſtantly increaſing. If, however, at a certain period it ſhall happen, that the denſity ſhall be increaſed to ſuch a degree that it is not moveable by the ſame impreſſions on its elaſticity as are neceſſary to excite a ſtrong vibration, the ſtrength of the ſyſtem can increaſe no further; and, on the contrary, according as the denſity is conſtantly increaſing, the force of the energy of the brain muſt be perpetually diminiſhing, and with that the ſtrength of the ſyſtem continually declining.

This is agreeable to the phenomena. In the beginning of life, ſenſibility depending upon the mobility of the nervous fluid, is conſiderable; but as life advances, it is conſtantly diminiſhing, whilſt the ſtrength of the ſyſtem is ſtill increaſing: and after a certain period, while both the elaſticity is farther diminiſhed and the denſity farther increaſed, the ſtrength that can be exerted muſt be continually declining.

This perhaps may be illuſtrated by ſome other conſiderations. In the beginning of life, the force of the heart is ſtrong with reſpect to the ſyſtem of arteries; and the latter accordingly become ſtretched out, and the body grows in bulk. This, however, we know, by the increaſing denſity of the arteries, goes on more and more ſlowly till it ſtops altogether.

Whilſt the force of the heart is conſtantly filling and diſtending the arterial ſyſtem, we may ſuppoſe the elaſticity of the nervous fluid to be ſupported in every part of the ſyſtem; and while the denſity is at the ſame time increaſing, the ſtrength of the body, by the tenſion and fulneſs of the arteries, will be ſupported and increaſed, as we have explained above.

But we have alſo obſerved above, that the exertion of the energy of the brain requires the fulneſs and tenſion of the veſſels of that organ; and that its energy will be ſupported and increaſed by the general fulneſs of the arterial ſyſtem.

The

The increaſing fulneſs of this, however, has its limits both from the denſity of the arteries becoming too great for the force of the heart, and from the reſiſtance of the veins becoming gradually diminiſhed. To explain this latter circumſtance, we muſt remark, that, from the experiments of Sir CLIFTON WINTRINGHAM, it appears, that in the beginning of life, the denſity of the coats of the veins, and conſequently their reſiſtance to the reception of blood from the arteries, is proportionally greater with reſpect to that of the arteries, in young animals than in thoſe that are older: but the denſity of the arteries, by the action of the heart diſtending and preſſing them, is conſtantly increaſing; while the ſame power not being applied to the veins, their denſity is not proportionally increaſed. From this it muſt happen, that the denſity of the arteries conſtantly increaſing will come at length to be proportionally greater than that of the veins, and conſequently throw a greater portion of blood into the latter; and after a certain period, the denſity of the arteries ſtill increaſing and throwing a greater proportion of blood into the veins, the fulneſs of the arteries themſelves will no longer increaſe, but will rather be further diminiſhed. As we have, however, ſaid above, that the vigour of the ſyſtem depends much upon the fulneſs of the arterial ſyſtem, ſo, as ſoon as this laſt ceaſes, the former can go on no longer to increaſe, and will be rather gradually diminiſhing.

Here, therefore, is another cauſe of a period being put to the increaſing vigour of the ſyſtem, and at the ſame time a cauſe aſſigned of its thereafter conſtantly declining. It is ſufficiently probable, that both theſe cauſes take place together at the ſame time of life; and with great reaſon it may be ſuppoſed to be nearly at the age of thirty-five.

The whole of this ſubject might be further illuſtrated, by ſhowing that the phenomena, in the decline of life and in old age, may be explained upon the principles we have laid down; but I have not room for ſuch diſcuſſions in this work.

I have now conſidered, under five heads, the chief circumſtances of the animal œconomy, and have endeavoured to point out the different conditions in which theſe may upon different occaſions be found: and in attempting to aſſign the cauſes

cauſes of theſe conditions, I have ſhown in what manner, and upon what occaſions, they may be different in different perſons.

Of PARTICULAR TEMPERAMENTS.

It has thus been my endeavour to lay ſome foundation for diſtinguiſhing the temperaments of men: but theſe temperaments, as has been already obſerved, are not to be diſtinguiſhed by attending to any one of theſe chief circumſtances alone; for the ſtate of any of theſe is commonly combined with a particular ſtate of all the others; and it is only by a combination of the particular ſtates of the chief circumſtances in the ſame perſon, that the temperaments are to be properly diſtinguiſhed. To explain this, we preſume, that in any one perſon a particular ſtate of the ſimple ſolid is pretty conſtantly combined with a particular ſtate of the fluids, with a particular ſtate of the diſtribution and proportion of theſe, and all theſe with a particular ſtate of the nervous ſyſtem; and as ſuch a combination may be formed in another perſon, but conſiſting in a differerence of the particular ſtates of each of the chief circumſtances, this will give a different temperament in theſe two perſons. So far therefore as we can find ſuch combinations to be ſteadily formed in any particular perſon, we ſhall be able to aſſign his particular temperament.

It muſt, however, be acknowledged to be uncertain, how far certain ſtates of the chief circumſtances of the œconomy are ſteadily connected together, and therefore how far we can extend our doctrine of temperaments to a great number of different men; but at the ſame time, it is only by *preſuming* upon a certain ſteadineſs of theſe combinations, that we can go any length in explaining the difference of temperament.

The ancients very early eſtabliſhed a diſtinction of temperaments, which the ſchools of phyſic have almoſt univerſally adopted ever ſince, and appears to me to be founded in obſervation. I am very much of opinion, that we can perceive a combination of a particular ſtate of the chief circumſtances of the œconomy to take place very ſteadily in certain perſons, and thereby to form at leaſt two of the temperaments aſſigned by the ancients. Accordingly, the circumſtances in which

theſe

theſe two temperaments ſeem to conſiſt, we ſhall now endeavour to explain; and I ſhall hereafter conſider how much farther we may proceed.

In doing this, it will be proper, in the firſt place, to mark out the ſeveral external appearances that concur in the ſame perſon; and from which concurrence taking place in many different perſons, we are led to preſume in theſe, one and the ſame combination or temperament.

One to be particularly mentioned, is that temperament which the ancients, and which phyſicians at all times ſince, have diſtinguiſhed by the appellation of the Sanguine. In this, the external appearances are the following. The hair ſoft, and never much curled, is of a pale colour, or from thence paſſing through different ſhades to a red; the ſkin is ſmooth and white; the complexion ruddy; the eyes commonly blue; the habit of the body ſoft and plump; after the period of manhood, diſpoſed to obeſity, and at all times readily ſweating upon exerciſe; the ſtrength of the whole body is moderate; and the mind ſenſible, irritable, cheerful, and unſteady.

Before going further, it is neceſſary to obſerve, that as no exact meaſure can be had of the different degrees in which the qualities we are to mention take place, I ſuppoſe a middle ſtate very nearly aſcertained by obſervation; and I am unable to give any other meaſure of qualities than merely by marking them as below or above the middle ſtate.

Upon this footing, I would explain the ſanguine temperament as conſiſting in the following ſtate of the ſeveral chief circumſtances of the œconomy. I ſuppoſe the ſimple ſolids to be lax; the maſs of blood to be of a moderate conſiſtence; the red globules and ſerum to be in large proportion; and the ſeroſity to be of moderate acrimony. I preſume the heart to be active, and rather ſtrong with reſpect to the ſyſtem of blood-veſſels; the quantity of blood in the arteries large with reſpect to that in the veins; and the quantity of fluids in the whole body large in proportion to the quantity of ſolid; the ſtate of the nervous ſyſtem to be ſenſible and irritable, but in every ſtate readily changeable. This temperament

rament is moſt exquiſite from the time of puberty to that of manhood; but continues its character in ſome meaſure throughout the whole of life. This temperament is liable to hemorrhagy, inflammation, and hyſteria; and with the ancients made the *temperamentum calidum et humidum.*

The other temperament diſtinguiſhed by the ancients, which I can characteriſe moſt diſtinctly and explain moſt clearly, is that which has been very conſtantly named the Melancholic. In this, the external appearances are the following. The hair is hard, black, and curled; the ſkin is coarſer, and of a dun colour, with a correſponding complexion; the eyes very conſtantly black; the habit of the body rather hard and meagre; the ſtrength conſiderable; the mind ſlow, diſpoſed to gravity, caution, and timidity, with little ſenſibility or irritability, but tenacious of all emotions once excited, and therefore of great ſteadineſs. In this temperament, I judge the ſimple ſolids to be firm and denſe; the maſs of blood to be of a thicker conſiſtence; the gluten abundant; the red globules and ſerum in moderate quantity, and the ſeroſity more acrid; the heart rather torpid, but ſtrong; the quantity of blood in the veins large with reſpect to that of the arteries; and the quantity of fluids in the whole ſyſtem moderate in proportion to the ſolids; the ſtate of the nervous ſyſtem to be, as expreſſed above, by the ſtate of the mind, that is, leſs ſenſible and irritable, but ſtrong and ſteady, and diſpoſed to admit the reflex ſenſations of ſadneſs and fear. This temperament is moſt completely formed in advanced life; but the characters of it appear often very early. It is liable to melancholia, hypochondriaſis, mælena, and hæmorrhois; and with the ancients made the *temperamentum frigidum et ſiccum.*

Theſe are the two temperaments we can the moſt clearly diſtinguiſh; becauſe they are almoſt in every reſpect the oppoſites of each other.

With reſpect to both, I think ſome illuſtration may be obtained, from conſidering what happens to every perſon both in the body and the mind during the progreſs of life. Of theſe changes I have already ſpoken pretty fully, when treating of the ſtrength and weakneſs of the nervous ſyſtem. From the circumſtances there pointed out, it will appear, that thoſe

thoſe which chiefly determine to a ſanguine temperament, occur eſpecially in the firſt part of life; and that thoſe which determine to the melancholic, as certainly occur in the after parts of it. Accordingly, from the effects we may conclude to the cauſes, eſpecially when at the ſame time the exiſtence of ſuch cauſes is clearly aſcertained; and therefore we may venture to aſſert, that the changes which happen in the courſe of life do well illuſtrate the doctrine laid down reſpecting theſe two temperaments, the ſanguine and the melancholic.

A further illuſtration to the ſame purpoſe may be drawn from the conſideration of the ſexes: for it is obvious, that the circumſtances of the ſanguine temperament, both in the body and the mind, appear more prevalent in the female ſex; while a greater denſity and leſs flexibility of the ſimple ſolid, with a proportional greater denſity and leſs mobility of the nervous power, make the character of the male ſex approach nearer to that of the melancholic.

I have thus endeavoured to explain the different ſtates of the human body, by referring them to two general ſtates or temperaments, which not only ſerve to diſtinguiſh the moſt part of men through the whole of life, but alſo to diſtinguiſh the different ſexes, and likewiſe the ſtate of particular perſons as they paſs through the different ages of life. Our doctrine, therefore, will apply very extenſively; but perhaps it may not ſeem to be very readily applicable to that great variety which would appear to take place in the human conſtitution.

With a view, therefore, to attempt ſome explanation of this variety, we ſhall remark, in the firſt place, that it may in ſome meaſure depend upon the two temperaments, which we have ſuppoſed chiefly to prevail, being ſeldom perfectly formed; or, in other words, upon the particular ſtate of the circumſtances in which they conſiſt, being ſeldom found in the moſt complete degree. For example, it is ſeldom that in the ſanguine, the ſimple ſolid is the moſt lax, or in the melancholic the moſt rigid, that is compatible with health. There is reaſon to ſuppoſe, that from the medium ſtate of denſity and firmneſs in the ſolid, there may be various intermediate degrees between the moſt lax upon the one hand, and the moſt rigid upon the other; and ſuppoſing that with each of theſe intermediate degrees, there is united a correſponding

ponding ſtate of the nervous power, there may then be ſo many intermediate and ſeemingly varying temperaments, neither completely ſanguine nor melancholic, though always approaching to the one or the other. This may explain, in ſome meaſure, the varieties in the temperaments of men, but it may be juſtly doubted if it will account for the whole.

It will therefore be proper, in the ſecond place, to obſerve, that it is doubtful if the chief circumſtances of the œconomy are always in the ſame proportion to one another that has been above ſuppoſed. For example, we have ſuppoſed that the denſity and the mobility of the nervous power are always in a certain proportion to one another: but this is not very certainly the caſe; and if we may ſuppoſe, as ſeems to be allowable, that in two perſons, the denſity being equal, the mobility may be greater in the one than in the other; ſo that, if this ſhould happen, it will be obvious that it might give a more exquiſite formation of the ſanguine, or a more moderate ſtate of the melancholic temperament. In this way, it is poſſible, that with a certain degree of denſity greater than uſual in the ſanguine, there may be a mobility greater than in proportion to this, we ſhall then have a middle temperament between the ſanguine and the melancholic, and perhaps what the ancients meant to denote by the title of Choleric; that is, of more ſtrength than in the ſanguine, and of more irritability than in the melancholic. It is poſſible alſo, that there may occur a ſimple ſolid more denſe than uſual in the ſanguine, and at the ſame time from a more humid ſtate of greater flexibility than in the melancholic; and if, along with theſe, there be an analogous ſtate of the medullary fibre of leſs mobility and elaſticity in proportion to the denſity, we ſhall then have that temperament which the ancients expreſſed by the title of Phlegmatic; that is, with leſs ſenſibility and irritability, but with more ſtrength and ſteadineſs, than in the ſanguine, and at the ſame time with more laxity and more mutability than in the melancholic.

In the whole of this diſcuſſion, we have conſidered the ſtate of the nervous power as chiefly modifying the temperaments of men; and more readily enter into this ſuppoſition, becauſe we preſume the ſtate of the nervous power to be almoſt always attended by a correſponding ſtate of the ſimple ſolid,

ſolid, and that both theſe together pretty conſtantly modify the ſtate of the fluids, both with reſpect to their quality, their proportion, and diſtribution.

Of theſe latter circumſtances, however, conſtantly following the ſtate of the ſimple ſolids and of the nervous power, I am by no means certain. As we obſerve, that at different periods of life there is a difference between the arteries and the veins, as to the circumſtances of denſity and capacity; ſo it is poſſible, that ſome difference in theſe reſpects may be eſtabliſhed in the original ſtamina, and may therefore in ſome degree run throughout the whole of life, and thus vary the ſtate of the fluids. It is alſo poſſible, that there may be conditions of the original ſtamina determining a difference in the ſtrength and activity of the heart with reſpect to the capacity of the blood-veſſels; or, on the other hand, the ſtate of the heart being given, there may be a difference in the denſity and reſiſtance of the ſanguiferous ſyſtem. In all theſe caſes, there may ariſe a difference in the quality, proportion, and diſtribution of the fluids, and thereby a further variety in the temperaments of men: and thus perhaps we may account for the difference of ſtature, bulk, and proportion, of the ſeveral parts of the body in different perſons.

All this might be illuſtrated more fully; but perhaps we have inſiſted long enough upon what may by many be thought perhaps too much depending upon conjectural reaſonings. It no doubt may, in ſome reſpects, be liable to this imputation; but I ſhould fain hope that it may ſerve to lay the foundation of ſpeculations which muſt be purſued before we can explain the important, and therefore neceſſary doctrines concerning the temperaments of men.

On this ſubject, it is very requiſite to remark further, that the conſideration of the operation of medicines is not only concerned with the general ſtate or temperaments of the human conſtitution, but alſo very much concerned with the peculiar conditions which take place in particular perſons, or in particular parts of the body; and which conditions are ſeemingly neither depending upon, nor neceſſarily connected with, the general temperaments.

Of

Of IDIOSYNCRASIES.

Theſe conditions are what phyſicians have called *Idioſyncraſies*. The term has been confounded with that of temperaments; but I mean here to expreſs by it thoſe conditions of certain perſons whereby certain functions of the whole or of particular parts of the body are affected by applications made to them, very differently from what theſe functions are affected in others, and very differently from what they are in perſons ſeemingly of the ſame general temperament.

Of theſe idioſyncraſies, the greater part of them ſeem to me to conſiſt in a preternatural degree of the ſenſibility or irritability of certain parts of the ſyſtem, or in a peculiar ſenſibility or irritability of the whole body, or in particular parts of it with regard to certain applications, and to thoſe only.

Of ſuch idioſyncraſies, thoſe that have been the moſt taken notice of are thoſe which occur with reſpect to the effects of taſte and odour. Taſtes are of conſiderable variety; but they are reduced to certain claſſes and orders, in which the moſt part of men are ſo well agreed, as to ſhew that the operation is nearly the ſame in all of them. This certainly happens with reſpect to the ſimple ſenſation; but with reſpect to the reflex of agreeable or diſagreeable, this is often conſiderably different in different perſons, and ſhows that there is room here for an idioſyncraſy which accordingly takes place; and there are many inſtances of it in the records of phyſic.

The inſtances, however, of a peculiar averſion in particular perſons to certain odours, are much more frequent. The records of phyſic are full of them; and examples of them are known almoſt to every body. The ſenſations ariſing from odour ſeem to be more various in different men than thoſe ariſing from taſte; ſo that mankind have hardly eſtabliſhed any other diſtinction of the former than that of agreeable or diſagreeable. Subdiviſions have been attempted, but with no conſent of mankind, ſo as to be expreſſed with any preciſion in common language. The ſenſation, therefore, is probably much varied in different men, and gives room for idioſyncraſies,

ſies, which accordingly appear without our being able to refer them to any particular claſſes or orders of odours; and the effects are not leſs remarkable by the operation of the ſame odour upon different perſons, than by its being ſo powerful in its degree, producing ſyncope, hyſteria, and epilepſy.

Theſe peculiar effects of ſenſations are manifeſtly extended to the alimentary canal. In this, and particularly in the ſtomach, the ſenſibility is not correſpondent to the general ſenſibility and irritability of the whole ſyſtem; for there are inſtances of ſtrong perſons moved by very ſmall doſes of emetics; whilſt, on the other hand, there are ſeemingly weakly perſons who are not moved but by very large doſes of the ſame.

There are inſtances of ſenſibility in the ſtomach that are peculiar to certain perſons, and appearing in few others. But I muſt acknowledge, that with regard to ſeveral of theſe idioſyncraſies, it is not eaſy to determine whether their effects depend upon an impreſſion made upon the nerves of the ſtomach, or upon a modification which theſe ſubſtances give to the fermentations and ſolutions that take place there. For example, if freſh honey gives pains of the ſtomach to certain perſons, as this is obviated by boiling the honey before it is taken into the ſtomach, it may be a doubt whether this volatile part of freſh honey operate by an impreſſion upon the nerves of the ſtomach, or by exciting a more active fermentation there. The aceſcent fermentation which occurs always in a greater or leſſer degree, is manifeſtly more or leſs readily excited in different perſons; for we know many perſons who take in acids and aceſcents in large quantities, without any appearance of a ſtronger aceſcency being excited, while I have known certain others from a very ſmall quantity of aceſcents taken in, have the ſtrongeſt marks of a morbid aceſcency immediately produced.

We know ſo little of the gaſtric fluid, and of its operation on different ſubſtances, that it is very difficult to explain the idioſyncraſies which take place in certain perſons and not in others, with reſpect to milk, oils, ſhell-fiſh, and ſome other ſubſtances. One of the moſt remarkable is this, that the white of egg, one of the mildeſt ſubſtances in nature, and readily digeſted in almoſt all the ſtomachs of men, cannot

however be taken in, even in ſmall quantity, by certain perſons, without immediately occaſioning much pain and ſickneſs.

In any attempts to account for theſe peculiarities, it ought to be kept in view, that the ſtomach is not only affected by ſenſations depending upon impreſſion, but likewiſe by thoſe which depend upon conſcioufneſs, or a perception of the ſtate of its own action; and that undoubtedly many of its ſenſations are of the latter kind.

It does not ſeem neceſſary to enter upon the conſideration of the idioſyncraſies of the inteſtinal canal, as they are to be explained from the ſame degree of ſenſibility that may be peculiar here as in the ſtomach. What farther may ariſe from a peculiar ſtate of the bile or other fluids poured into the inteſtines, we cannot pretend to judge. The various ſtate of the alvine excretion depends upon many different cauſes which there is no place for conſidering here; but it is moſt likely that ſome of theſe cauſes may be more conſiderable and peculiar in certain perſons than in others, and give an idioſyncraſy in that reſpect. A torpor, or ſlower motion of the inteſtinal canal, is eſpecially to be ſuſpected.

We have thus endeavoured to mark out the various caſes of idioſyncraſy; and although perhaps we may not have done it completely, yet it is hoped enough has been ſaid to ſhew, that in the employment of remedies a phyſician muſt be directed by the conſideration of idioſyncraſies as well as by the general temperament.

In the caſe of any perſon, therefore, occurring to a phyſician for the firſt time as a patient, particular inquiry ſhould be made reſpecting the idioſyncraſies which may prevail in his conſtitution; and if he himſelf ſhould happen to have had no experience of the effects of particular applications, the idioſyncraſies of his parents ſhould next be inquired after; for idioſyncraſies are very often hereditary.

We have thus attempted to point out the various ſtates of the human conſtitution that may be found more conſtantly different in different perſons; but it will be proper now to remark, that theſe conſtitutions may be variouſly modified by thoſe

thoſe circumſtances of climate, diet, exerciſe, and the like, to which men may be expoſed in the courſe of life, and which it is well known have a great power in changing the natural conſtitution into one not only very different, but perhaps even oppoſite. It is therefore well known that a phyſician, in practiſing upon the human conſtitution, either for the preſerving of health or of curing diſeaſes, muſt not only conſider the temperaments and idioſyncraſies which nature has originally given to the conſtitution, but muſt alſo conſider the accidental ſtates of it, which may have been produced by the circumſtances and manner of life.

It is, however, not my buſineſs here either to explain thoſe various accidental ſtates, or to aſſign their cauſes; although it might be proper enough to lay a foundation for that doctrine by explaining the powers of cuſtom and habit in general, as I formerly endeavoured to do in my lectures on the materia medica. It does not, however, appear to me neceſſary to do it now, becauſe for a pretty full information on this ſubject, I can refer to a Diſſertation *de Conſuetudine*, publiſhed ſome years ago by my ſon Dr. HENRY CULLEN; and another edition of which I hope he will ſoon give in a ſtill more complete form in the Engliſh language.

To conclude what we have to offer reſpecting the operation of medicines, it is proper now to remark, as I have ſaid above, that in conſidering this ſubject, it is very neceſſary to attend to the ſympathy and conſent which takes place between the ſeveral parts of the human ſyſtem; and although we cannot proſecute this conſideration fully here, we muſt not omit taking notice of one very general caſe of very great influence in almoſt the whole of the doctrines of the materia medica, as this particular ſympathy is concerned in the operation of the moſt part of medicines, and explains the operation of many which is otherwiſe difficult to be underſtood.

This is the operation of medicines upon the ſtomach, from which motions are often propagated to almoſt every diſtant part of the human body, and peculiar effects produced in thoſe parts, whilſt the medicine itſelf is only in contact with the ſtomach.

The ſtomach is the part by which the moſt part of ſubſtances introduced into the interior parts of the body generally paſs; and it is endued with a peculiar ſenſibility, which

renders it ready to be affected by every ſubſtance entering into it that is active with reſpect to the human body. Every thing, therefore, of this kind introduced into the ſtomach operates almoſt always there, and for the moſt part only there. It is now, however, well known to phyſicians, that the moſt conſiderable inſtance of the ſympathy mentioned above, is afforded by the ſtomach, ſo connected with almoſt every other part of the ſyſtem, that motions excited there are communicated to almoſt every other part of the body, and produce peculiar effects in thoſe parts, however diſtant from the ſtomach itſelf. This indeed is very well known; but that the effects of many medicines which appear in other parts of the body are entirely owing to an action upon the ſtomach, and that the moſt part of medicines acting upon the ſyſtem act immediately upon the ſtomach only, is what has not been underſtood till very lately, and does not ſeem even yet to be very generally and fully perceived by the writers on the materia medica. It will therefore be proper here to ſay in what manner this doctrine may be eſtabliſhed.

1ſt, That medicines ſhowing conſiderable powers with reſpect to the whole ſyſtem, act eſpecially or only on the ſtomach, will appear from all thoſe caſes in which the effects appear ſoon after the ſubſtance has been taken into the ſtomach, and before they can be ſuppoſed to have gone further into the body, or to have reached the maſs of blood. Thus, Sir JOHN PRINGLE, from the ſudden operation of the Peruvian bark in preventing the paroxyſms of intermittent fevers, properly concludes, that it cannot be by its antiſeptic powers with reſpect to the fluids, but by a certain operation immediately upon the ſtomach. See Diſeaſes of the Army, Appendix. p. xxv.

2dly, As medicines are commonly in the firſt place applied to the ſtomach; ſo all thoſe of volatile, active, and penetrating parts, muſt immediately and eſpecially act upon the ſtomach: and from this conſideration, as well as from the ſuddenneſs of their effects which commonly appear, we may conclude their action to be upon the ſtomach only. Accordingly, I conclude that the action of the volatile alkali, and ſome other ſaline ſubſtances, is upon the ſtomach alone, and very rarely by any antiſeptic powers with reſpect to the fluids.

3dly,

3*dly*, Though medicines do not to the taſte or ſmell diſcover any volatile or active parts, yet if their effects depend upon the change which they produce in the ſtate of the nervous power, it is hardly to be doubted that they operate only upon the ſenſible and irritable parts of the ſtomach. This I conceive to be the caſe of opiates and of moſt other narcotic powers, whoſe ſubſtance is known to remain in the ſtomach long after they have diſcovered their effects in the moſt diſtant parts of the ſyſtem.

4*thly*, If there are medicines ſuppoſed to act only when they come in contact with the parts they are ſuppoſed to act upon, and that a certain quantity is neceſſary to be applied to theſe parts; and further, if ſuch medicines are either thrown into the ſtomach in ſmall quantity, or are of a nature to be ſlowly diſſolved there, ſo that they cannot be ſuppoſed in ſufficient quantity to come in contact with the parts they are deſtined to act upon, whilſt however their effects appear in theſe parts; it muſt, I think, be concluded, that theſe effects depend entirely upon the operation of theſe medicines upon the ſtomach. This, if I miſtake not, applies to the caſe of moſt vegetable aſtringents, and perhaps to the foſſil alſo, whoſe effects, and eſpecially their ſudden effects, upon diſtant parts of the ſyſtem, can only be accounted for by their operation upon the ſtomach.

5*thly*, Another circumſtance leading us to ſuppoſe that medicines act immediately upon the ſtomach, and by their operation there, affect the reſt of the ſyſtem, is the conſideration of all theſe caſes where they affect the ſyſtem very generally, while at the ſame time they act both ſuddenly and in ſmall quantity, and therefore in circumſtances which cannot allow us to ſuppoſe that they are conveyed in ſubſtance to the parts in which their effects appear. Thus, as has been above obſerved, medicines which act very generally upon the nervous ſyſtem, or upon the particular parts of it remote from the ſtomach, cannot be ſuppoſed to be transferred in ſubſtance to the whole, or even to the particular parts of that ſyſtem; and therefore muſt neceſſarily be ſuppoſed to act in the ſtomach only. Not only, however, with reſpect to the nervous ſyſtem, but alſo with reſpect to the ſanguiferous, and very general effects produced there, as for example a ſweating excited univerſally over the whole body, can be produced no otherwiſe

wiſe by internal medicines excepting by ſuch as act on the ſtomach, and from thence communicate a ſtimulus to the heart and arteries. In many caſes of increaſed evacuations, it is indeed pretty evident that the medicines exciting the evacuations are actually conveyed and applied to the ſecretories or excretories of the parts concerned; but this cannot poſſibly be ſuppoſed with regard to ſweating, not only from the ſmall quantity of medicine employed, but perhaps alſo from the nature of the excretion, which is certainly not depending upon glands and their excretories.

6thly, Another circumſtance inducing us to ſuppoſe medicines to act only on the ſtomach, is, that of their being capable of being changed by the aſſimilating powers of the ſtomach and inteſtines; for ſuch medicines, if they act at all, muſt act immediately upon their entering into the ſtomach, or before they are changed by digeſtion.

It is true, with reſpect to vegetables, and alſo certain animal ſubſtances, it is often a certain portion of them only that can be ſubjected to our digeſtive powers, while the medicinal part of the ſame is hardly affected; and therefore it may be alleged, that their operation on the interior parts is not prevented by the powers of digeſtion. This indeed does certainly ſometimes happen: but ſtill, as digeſtion breaks down very entirely the texture of vegetables, and evolves the ſeveral parts of them more entirely than they were in the entire vegetable, it thereby gives them an opportunity of acting immediately upon the ſtomach, and even may thereby prevent their activity from reaching beyond this organ.

7thly, Another circumſtance which confines the operation of many medicines to the ſtomach, is their ſuffering a change there, if not by digeſtion at leaſt by mixture.

It appears to me very clear, that in all animals who take in a quantity of vegetable aliments, and therefore in man, there is an acid, and commonly in conſiderable quantity, very conſtantly preſent in the ſtomach. It is therefore probable, that all alkaline ſubſtances are more or leſs neutralized there; and that conſequently, if they act at all as naked alkalines, they can act only upon the ſtomach before they are neutralized. It appears,

appears, however, that alkaline ſubſtances frequently prove powerful medicines with reſpect to the remote parts of the ſyſtem; and I think it muſt be concluded that their effects muſt be imputed to their being changed into neutral ſalts in the ſtomach, and operating in the other parts of the ſyſtem as neutrals only; or perhaps their operation may be that of their changing the nature of our fluids, by their abſtracting a conſiderable portion of the acid which ſhould have entered into the compoſition of theſe fluids.

On this ſubject of the changes which ſubſtances undergo in the ſtomach, it is to be obſerved, that the acid of the ſtomach operates in this reſpect in two ways.

1*ſt*, The acid may be applied to compounds, conſiſting of an alkali, and another part which has a weaker attraction to the alkali than the acid of the ſtomach. In ſuch caſe, the acid of the ſtomach is joined with the alkali, and throws looſe the ſubſtance before joined with it, ſo that the compound can no longer act in the form in which it was thrown into the ſtomach; and this I think happens with reſpect to all ſoaps taken into the ſtomach, and which therefore cannot have any of the effects which their ſaponaceous form has been ſuppoſed to produce with reſpect to our fluids.

Another effect of a like reſolution by the acid of the ſtomach, is, in the caſe of neutral ſalts formed of an alkali with the acid of tartar; which, with reſpect to alkali, ſeems to have a weaker attraction than the acid of the ſtomach. It is therefore that we are ſo often diſappointed of the operations of ſoluble tartar; and if we are not, it muſt be imputed to the neutral formed of an alkali with the acid of the ſtomach, being as powerful a laxative as that formed of the acid of tartar.

2*dly*, There is another caſe in which the acid of the ſtomach acts, and that is when it is applied to certain earthy and metallic ſubſtances, which are not ſoluble in our fluids, and are therefore, with reſpect to our bodies, perfectly inert; but by having the acid of the ſtomach applied

applied to them, they are often changed into very active medicines, as we know to happen with respect to magnesia alba, and to several preparations of antimony and mercury.

CHAP.

CHAPTER II.

OF THE SEVERAL MEANS OF OUR LEARNING THE VIRTUES OF MEDICINES.

WE have already ſaid, that mankind very early became acquainted with the medicinal virtues of ſome ſubſtances not employed in diet; and we can eaſily conceive in what manner ſuch knowledge might be acquired, although we cannot apply our conjectures on this ſubject to particulars, and hardly at all to the many particulars that ſeem to have been very early employed by the practitioners of phyſic. It may naturally be ſuppoſed that theſe practitioners, intent upon increaſing the number of remedies, might, by accidental obſervation, by random trial, or as guided by ſome analogy, diſcover new remedies, and thus increaſe their number, and retain thoſe eſpecially which experience ſeemed to confirm.

Upon this footing it has been alleged, that the numerous remedies mentioned by DIOSCORIDES and other ancient writers, were entirely the fruits of experience: But from what we have ſaid in our Hiſtory, and what we ſhall hereafter ſay reſpecting the fallacy of experience, it will be very evident, that as to moſt of the medicines employed, experience

rience has had a very small share in establishing the virtues which have been commonly ascribed to them. Those disappointments in practice which have so frequently occurred from following the ancients, have very properly engaged modern physicians to seek for means not only of ascertaining more exactly the virtues of the medicines in use, but likewise for investigating the virtues of substances before untried.

For this purpose the chemists made the first attempts; and PARACELSUS introduced the absurd notions of astral influences and of signatures; while succeeding chemists have suggested the utility of a chemical analysis. The two first of these have been now long ago absolutely exploded, though their effects have not yet entirely disappeared in the writings on the materia medica. The third means of a chemical analysis, though not entirely useless, does not go a great way for the purpose we are inquiring after.

The means which at present are more especially resorted to and cultivated, are those taken from Chemical Examination, from Botanical Affinity, from Sensible Qualities, and from Experience; and the application of each of these I shall now consider with all possible attention.

ARTICLE I. *Of the Use of Chemical Resolution in investigating the Virtues of different Substances.*

When the employment of chemical remedies became first considerable in the hands of PARACELSUS and his followers, it was accompanied with such visionary and absurd theories, as quite confounded and greatly corrupted the doctrines of the materia medica; but in progress of time chemistry corrected its own errors, and has come at length to be of the greatest utility in improving the materia medica. It has done this, by ascertaining more exactly the qualities of the medicines before known and employed; and in particular it has not only greatly relieved the materia medica, by rejecting the inert and superfluous, and

by

by marking the degree of qualities in ſimilar ſubſtances, but it has directed to a more judicious choice of theſe. Beſides thus correcting and improving the ancient materia medica, it has certainly given a valuable new one, by the many new productions which it has diſcovered, and by the preparations it has invented or improved. Almoſt the whole of the ſaline ſubſtances taken from the three kingdoms, are the fruits of chemiſtry; and the inflammable matters, except the expreſſed oils and a few foſſil ſubſtances, are alſo the productions of the ſame art.

Such have been the advantages obtained from chemiſtry in affording many, and ſome of the moſt efficacious, particulars of the materia medica; and to the choice and proper uſe of the whole, an accurate knowledge of chemiſtry is abſolutely neceſſary.

It has, however, been alſo ſuppoſed, that this art has actually been, or might be, uſeful in inveſtigating the virtues of vegetable and animal ſubſtances; although it does not appear to me to have been in this particular ſucceſsful. What has been called the Chemical Analyſis, or the diſtillation of ſubſtances without addition, has not anſwered the expectations entertained of it. After many very competent trials, it is now agreed, that ſuch an analyſis affords no correct nor certain information concerning the conſtituent parts of mixts; and the application of this kind of reſolution, therefore, is now entirely, or at leaſt very much neglected.

The chemical reſolution now attempted, is that which is ſuppoſed to ſeparate the parts of mixts without changing or much altering their nature. Thus, by a diſtillation of plants with water, we obtain their oils very entirely ſeparate from their other parts, and in ſuch condition as we ſuppoſe them to have exiſted in the living plants. By the application of different menſtruums, under different degrees of heat, we ſuppoſe that we ſeparate as ſoluble in theſe different menſtruums, parts which exiſted in the ſame ſtate in the entire plant; although ſuch a ſuppoſition in many caſes is to be doubtfully admitted, as in the ſequel we ſhall have occaſion to remark. But however this may be, we muſt here obſerve, that by theſe practices it is ſeldom that we diſcover virtues unknown

known before, and commonly only find out in what part of the ſubſtance, the virtue otherwiſe known more eſpecially reſides. By ſuch reſolution, indeed, we may upon ſome occaſions find a virtue, that in the concentrated ſtate in which it is obtained, is more conſiderable than it was as diffuſed in the entire plant; and ſometimes we may ſeem thereby to find an entirely new medicine: but I hardly know any inſtances of this, or of our thus inveſtigating virtues not known before. It is poſſible indeed, that by our finding virtues lodged pretty conſtantly in parts ſeparated by peculiar menſtruums, we may have an analogy leading us to ſuppoſe like virtues in the ſubſtances which we find to be extracted by like menſtruums; but this analogy is very ſeldom applicable. For example, although we ſhould find the purgative virtue of plants to be commonly reſiding in the reſinous parts of them, we cannot conclude that a plant which yields a reſin to a ſpirituous menſtruum is therefore of a purgative quality; and I will venture to aſſert, that the analogy drawn from chemical reſolution goes but a very little way in inveſtigating virtues.

Here, however, it would be improper to omit acknowledging the great utility which has been derived from the labour that has been beſtowed in examining the various ſubjects of the materia medica by the ſolution of them in different menſtruums. Theſe labours have certainly aſcertained the proper pharmaceutical treatment of many ſubſtances, and have thereby very much improved our knowledge of the materia medica, eſpecially with reſpect to the preparations and compoſitions which form ſo conſiderable a part of it.

I have thus acknowledged the general utility of theſe labours, and ſhall have occaſion in another place to ſay to what extent they are more particularly uſeful.

ARTICLE II. *Of the Uſe of Botanical Affinities in aſcertaining the Medical Virtues of Plants.*

It has happened, I think unfortunately for the materia medica, that the botaniſts have deemed it incumbent upon them not only to diſtinguiſh plants from one another, as was their proper buſineſs, but alſo to point out their medical virtues;

tues; a taſk to which they were often very unequal. They have, however, commonly attempted it; and have done it in the moſt imperfect manner, for they have commonly compiled merely from preceding authors with very little choice or judgment, and have thereby only multiplied uſeleſs and erroneous writings.

This is truly the ſtate of their labours on particular ſubjects; but the later botaniſts have thought of much more extenſive application of their ſcience, as they have attempted to apply it very generally to the aſcertaining the virtues of vegetables.

When the botaniſts found that vegetables, by a ſimilarity in the parts of their fructification, might be arranged under certain genera, orders, and claſſes, this arrangement eſtabliſhed what I call their Botanical Affinities. This affinity has been ſhown to apply in a conſiderable degree to a great number of vegetables, though not yet to the whole of them; but wherever it has been applied to orders and claſſes, ſo as to ſhew a very great ſimilarity and affinity amongſt all the ſeveral ſpecies comprehended under them, theſe are properly conſidered as natural orders or claſſes.

After theſe natural orders came to be properly eſtabliſhed, the botaniſts came to perceive that where a great botanical affinity took place, there was generally alſo a remarkable ſameneſs, or affinity, amongſt the ſeveral ſpecies with reſpect to their medical virtues.

This in general was well founded; and ſuch a medical affinity does actually take place, not only in the ſpecies of the ſame genus, but alſo to a great degree in the ſpecies of thoſe orders and claſſes which may be properly conſidered as natural. This gives an analogy whereby we may very often preſume that an untried vegetable is of the ſame nature and qualities with thoſe of the ſame genus and order to which it is related by a botanical affinity.

This is truly to a certain extent juſt, and applicable with ſome advantage; but it is by no means ſo univerſally applicable as the botaniſts would ſeem to inſinuate, as there are every where many exceptions to be found.

Even

Even in the ſpecies of the ſame genus, there is often a great difference of qualities in the different ſpecies. The cucumis melo is very different in its qualities from the cucumis colocynthis.

In the natural orders, the exceptions are every where ſtill more conſiderable. In ſome of theſe orders, which conſiſt for the moſt part of the mildeſt vegetables, there are ſometimes thoſe of a deleterious kind; and in certain orders which conſiſt of the moſt active and powerful ſubſtances, there are thoſe of a very inert and mild kind. The lolium temulentum among the gramina is an inſtance of the firſt aſſertion; and the verbaſcum among the Luridæ or Solanaceæ, is an inſtance of the ſecond.

Another obſervation to be attended to in employing the general analogy is, that though the plants of the ſame order may have a great reſemblance in the general quality, they have this in ſuch different degrees, as by no means to admit of an indifferent choice for the purpoſe of medicine.

A further obſervation, and of ſtill greater importance, is, that although there be ſome reſemblance in the qualities of the plants belonging to the ſame order, yet in the ſeveral ſpecies the reſemblance is not only ſeldom exact, but more commonly there is a peculiar modification in each: and very often with the quality belonging to the order, there is aſſociated another, which is totally different either from that, or from any other of the order, and ſometimes of a dangerous kind; ſo that the heedleſs practitioner might be very much deceived in truſting to a botanical affinity alone.

It ſtill farther merits attention, that though plants of the ſame natural order have commonly the qualities belonging to the order ſimilar in all their ſeveral parts, yet this is by no means univerſal. Plants in general have the qualities of their ſeveral parts conſiderably different, ſo that the root is often of a very different quality from that of the leaves or ſeeds; and the reſemblance that may be in the fructification, which eſpecially eſtabliſhes their botanical affinity, is by no means to be extended to all the ſeveral parts of the plants agreeing in that affinity. In their ſeveral parts, the common quality may not only be in very different degree, but in ſome of the parts there may be a widely different and even a contrary quality.

From

From all these considerations, it will readily appear, that the botanical affinity of plants, though it may be of some use in investigating their medical qualities, cannot be applied to the ascertaining these virtues but with a great deal of caution, and never can afford any certain conclusion without examining at the same time their sensible qualities; nor even then, except when the supposed medical virtue is confirmed by actual experience on the human body.

ARTICLE III. *Of the consideration of the Sensible Qualities of Substances, as pointing out their Medical Virtues.*

Another means proposed for judging of the virtues of different substances is, by attending to their sensible qualities of taste, smell, and colour. As we have already remarked that the operation of medicines is chiefly on the nervous system, so that as the sensations of taste and smell depend upon an action of certain substances upon the nerves of the tongue and nose, and their effects are very often from thence communicated to the rest of the body; so it may in some measure be presumed, that those actions on the organs of taste and smell may be communicated to the whole of the nervous system, or may show an analogous power with respect to the system when applied to the other nervous parts of it.

Upon this, indeed, I rest so much, that I presume very confidently to give it as a very general rule, that those substances which do not at all affect the taste or smell, and even those which affect these organs in a slight degree only, may be considered as inert and useless; and that all such substances should be rejected from the lists of the materia medica, excepting a very few, which, though without sensible qualities, may, on this very account, be of a nourishing, emollient, or demulcent quality.

Although physicians have not sufficiently attended to this general rule, they have, however, at all times, from substances being endued with sensible qualities, presumed upon their activity in the human body, and from the state of their sensible qualities have formed a judgment of their medical virtues. It has indeed almost always happened, that from a similarity

larity of taſte and ſmell in different ſubſtances, phyſicians have been ready to ſuppoſe a ſimilarity of virtues.

Such a ſuppoſition indeed is in many inſtances well founded; but it has been carried too far, as a ſimilarity of taſte and ſmell in different plants has been ſuppoſed to point out with ſome exactneſs the ſame medical virtues. Sir JOHN FLOYER, DAVID ABERCROMBIE, HOFFMAN, and ſeveral others ſince their time, have, upon this plan, given ſyſtems of the whole materia medica.

In the ſequel, I ſhall have occaſion to make many applications of the general doctrine, and ſhall endeavour to ſhow how far it may be juſtly carried; but at the ſame time, it is very proper here to be at ſome pains in pointing out the fallacy that attends the univerſal application of it.

In the firſt place, there is a conſiderable difficulty in aſcertaining the difference of taſtes in different ſubſtances. There are ſome, ſuch as the acid, the ſweet, the bitter, and the ſtyptic, which can be very well diſtinguiſhed from one another, and about which mankind are generally agreed; but there are many other taſtes which cannot be comprehended under any one general head. It appears to me that ſome general heads have been attempted, if not improperly at leaſt to very little purpoſe. Thus it has been common to make a general claſs of taſtes under the title of Acrid; but this term expreſſes the force of impreſſion rather than any particular ſenſation; and it has always comprehended ſubſtances of otherwiſe very different qualities, which we ſhall conſider more particularly afterwards under the head of Stimulants.

Another title employed with no better ſucceſs in forming a claſs of taſtes is the Nauſeous; which is manifeſtly too general, as comprehending many which in general have a diſagreeable, but at the ſame time a peculiar taſte; in other words, one different from any other, and therefore not to be brought under any general title. It is obvious likewiſe, that the claſs of nauſeous taſtes comprehends many ſubſtances of very different virtues; and this muſt always give an inſuperable difficulty in the arranging virtues according to taſte.

Beſides

Beſides the general taſtes which we have ſaid are tolerably well aſcertained, there are many combinations of theſe which gives a variety of taſtes not to be exactly aſcertained, nor always, ſo far as we yet know, to be taken as a mark of particular virtues.

But further, when we have collected a number of ſubſtances under any one of the general claſſes of taſtes, we find the individuals poſſeſſing very different degrees of the ſame quality, and thereby of very different powers. In many inſtances, indeed, where the quality of the claſs is prevalent in a plant, it has at the ſame time joined with it other qualities which give it different virtues from thoſe of the general claſs. It is needleſs, however, to inſiſt further here on the fallacy of the general doctrine, becauſe we ſhall have frequent occaſion hereafter to take notice of it, and to point out the many exceptions with which it is to be received.

Bodies which give out a ſtrong ſcent, whether agreeable or diſagreeable, ſeem to be peculiarly fitted to act upon our nervous ſyſtem; and ſome very powerful medicines are remarkable for this quality. LINNÆUS, however, carries the matter too far, when he maintains, that odorous bodies act upon the nerves only, whilſt ſapid bodies act upon the muſcular fibres only; for it is evident that ſapids act alſo, and ſometimes very powerfully, upon the nerves.

Whatever may be in this, I go on to obſerve, that the judging of the virtues of plants from their particular ſcent, is liable to ſtill more fallacy than the doctrine of taſtes. Scents are of greater diverſity than taſtes, and it is ſtill more difficult to reduce them to any general claſſes. Indeed it does not occur that any other general diviſion can be made of them, than that of the agreeable and diſagreeable. It is true that each of theſe comprehend a great variety, but not to be aſſorted with any preciſion under general heads. LINNÆUS has attempted this; but it is enough to look at his general titles, and his enumeration of plants under each, to perceive that they give no preciſe ideas, nor point out any common qualities, but what ariſe from the general terms of agreeable and diſagreeable; and that even theſe are conſiderably diverſified in reſpect of power, and very often ſhow different effects according to the difference of the perſons to whom they are applied. The

analogy, therefore, afforded by odours is of exceeding little uſe in illuſtrating the materia medica.

LINNÆUS, when he alleges that the virtues of medicines may be known from their ſenſible qualities, does, beſides the taſte and ſmell, ſuppoſe that the colour likewiſe may give ſome indication of virtues; and accordingly he has the following paragraph: "Color pallidus *inſipidum*, viridis *crudum*, "luteus *amarum*, ruber *acidum*, albus *dulce*, niger *ingratum* "indicat." But nobody poſſeſſed of the ſmalleſt knowledge of plants can miſs to mark ſo many exceptions to each of theſe, as to perceive that the attempt to eſtabliſh ſuch general poſitions is extremely frivolous and uſeleſs.

ARTICLE IV. *Of acquiring the Knowledge of the Virtues of Medicines by Experience.*

An experience of the effects of ſubſtances upon the living human body, is certainly the only ſure means of aſcertaining their medical virtues; but the employing of this experience is extremely fallacious and uncertain, and the writers on the materia medica abound with numberleſs falſe concluſions, which are however ſuppoſed or pretended to be drawn from experience. Such, indeed, is the ſtate of this matter, that nobody can conſult thoſe writers with any ſucceſs or ſafety, unleſs he is prepared with a great deal of ſcepticiſm on the ſubject; and it has been owing to want of diſcernment in this matter, that the writers upon it have compiled one after another ſo many particulars that are frivolous and falſe. It may be uſeful, therefore, to ſtudents, if we ſhall here point out the many miſtakes and falſehoods which ſeem to have been drawn from pretended experience.

The firſt inſtance to be given of this, is with reſpect to thoſe ſuppoſed remedies which, both from their nature and from their being placed at a diſtance from the human body, cannot be ſuppoſed to have any action upon it. Such are the various charms, ſuperſtitious practices, ſympathetic powers, and inodorous amulets, which have been formerly employed. Theſe are indeed in the preſent age very generally neglected; but it ſerves ſufficiently to ſhow the fallacy of experience, that

that formerly thoſe remedies had numerous teſtimonies in their favour. Mr. BOYLE thought he had ſeen with his own eyes the operation of the ſympathetic powder; and he had the teſtimony of divers phyſicians and other ſober perſons in its favour. It is not neceſſary at preſent to give other inſtances of this; but if it were proper to do it, we would refer to the ſecond volume of the Acta Naturæ Curioſorum, Obſervation 195, a collection of old women's tales, countenanced by the publication of them by a learned ſociety within theſe forty years. Here is a ſpecimen, Art. xxi. *Lactis abundantia et defectus.* "Pro certo affirmarunt mihi nuper "matronæ binæ prudentes et honeſtæ, ſe in ſeipſis efficaciam "feminis nigellæ multoties expertas eſſe, quod nempe retro "appenſum lac abundans diſcuſſerit, antrorſum autem auxe-"rit." It is indeed to be regretted that ſuch remedies are not every where ſufficiently exploded, when we find ſo eminent a practitioner as the late Mr. DE HAEN ſhowing ſome faith in the verbena employed as an amulet. But a perſon who like him believed in magic, muſt have been expoſed to every ſuperſtitious fancy.

Another inſtance of falſe experience I would give, is with reſpect to the virtues imputed to ſeveral ſubſtances, which though taken into the body, paſs through it quite unchanged, and are abſolutely inert, as they are neither ſoluble in our fluids, nor endued with any qualities that can operate upon either the ſolids or fluids of our bodies. Such are the various *Silicious* bodies, from mountain cryſtal to the gems or precious ſtones which have formerly had a place in our diſpenſatories; and which, though now expunged from the Britiſh, do ſtill hold a place in many others. Their virtues are ſtill ſuppoſed and mentioned by materia medica writers; and when the late Mr. VOGEL ſupports the virtue of mountain cryſtal from his own experience, I have no doubt of his having been deceived in his experiments.

To give a third inſtance, whenever to ſubſtances obviouſly inert, or ſuch as have little power in changing the human body, and ſuch as are every day taken into it in conſiderable quantity, without producing any ſenſible change, we find conſiderable effects imputed, it may be held to be a miſtaken experience. Thus, when the excellent LINNÆUS tells us that he preſerved himſelf from the gout by eating every year

plentifully of ſtrawberries, I am perſuaded that he was deceived by a miſtaken experience. It is indeed ſurpriſing that this eminent perſon ſhould have been expoſed to ſuch a fallacy; but in the writings on the materia medica, there occur hundreds of ſuch fallacies under very reſpectable names.

In almoſt all the writings upon this ſubject, many virtues have been imputed to ſubſtances either abſolutely inert, or poſſeſſed of ſenſible qualities in a ſmall degree only. Theſe virtues, indeed, are often ſuppoſed upon a pretended experience; but practitioners have ſo clearly diſcovered the fallacy of this, that now for a long time paſt they have been neglecting more and more theſe inert and impotent circumſtances. The catalogues of the materia medica have been conſtantly diminiſhing in the ſucceſſive editions of our diſpenſatories; and it has been chiefly by the omiſſion of thoſe uſeleſs ſubſtances. This, however, in the moſt part of them, has not gone ſo far as perhaps it might have done; and here a long liſt might be given of ſuch as ſeem to be improperly retained; but we abſtain from this at preſent, as we ſhall have occaſion to do it more properly with reſpect to moſt of the particulars hereafter.

A fourth inſtance of falſe experience, is when medicines are ſaid to have cured diſeaſes, or to have corrected circumſtances of the body, which never exiſted. An example of this is, when medicines are ſaid to have corrected an atrabilis; a ſtate of the fluids, which all the reaſoning of Dr. BOERHAAVE cannot perſuade me, to have ever taken place in the human body. It ſeems to have been a pure hypotheſis of the ancients, who were by no means in a condition to judge properly of ſuch matters.

I am inclined to judge in the ſame manner with reſpect to the lentor or preternatural ſpiſſitude of the fluids ſo commonly ſuppoſed by the moderns. That no ſuch morbid ſpiſſitude can ever occur, we would not poſitively aſſert; but there is hardly in any caſe evidence of its having actually taken place: and it is probable, that in ninety-nine caſes of the hundred in which it it has been ſuppoſed, it is a mere hypotheſis. Conſidering both this and the falſe theory with reſpect to the operation of the medicines ſuppoſed to cure it, there

there can be little doubt in asserting, that it affords many instances of a false experience adduced by writers on the materia medica.

Another example of the same kind occurs with respect to *alexipharmics*, so frequently mentioned. For, not to mention the doubts that might be raised, in many cases of fever, concerning the existence of a morbific matter, and the doubts also with respect to the cure of fevers as depending upon the expulsion of such matter, it may be alleged, that not only the doubtful existence of their object, but also the want of any clear evidence of their operation, gives every reason to believe that the alexipharmic powers reported by writers are, for the most at least, instances of a false experience.

A fifth instance of a false experience adduced, may be found in many cases where a disease does actually take place; but where the operation of the medicines supposed to cure it, is so far as we yet know, extremely improbable. One example of this seems to be the supposed solution of a stone in the bladder by medicines taken in by the mouth. It is very doubtful if any such medicines are yet known to physicians: but not to enter into the disputes that have lately occurred, and which may still subsist among physicians upon this subject, it is very probable that in the many instances of such a power, reported both by ancient and by modern writers, they afford many examples of a greatly mistaken experience.

Under this head may be mentioned the reports of the effects imputed to medicines, which, though not impossible, are, however, from our late experience rendered very improbable, at least in the many instances in which they have been alleged. An example of this which may be given, is with respect to medicines supposed to promote the menses in the female sex. That there are medicines having such a power, is hardly to be denied; but practitioners have been often disappointed in the employment of the medicines said by writers on the materia medica to have had such a power; and I have had many of the most eminent practitioners of these days giving me this report. There is, however, hardly any virtue more frequently ascribed to medicines than this in the materia medica writers; and it may therefore be asserted,

that

that in few cafes thofe writers have had it afcertained by any proper experience.

Another example of the fame kind that may be alleged, is with refpect to medicines faid to promote urine. That there are medicines of fuch a power, every body knows; but at the fame time every practitioner will allow that it is an effect which he often fails in producing, though employing the medicines recommended for that purpofe by materia medica writers: and it may be fufpected, that in very many of the inftances in which they afcribe this virtue to medicines, they have proceeded upon a falfe experience, or perhaps upon none at all.

But if the emmenagogue and diuretic powers have been fo often falfely afcribed to medicines, this will be more readily admitted to be the cafe with refpect to thofe alleged to promote the birth of children; and more certainly ftill with refpect to thofe faid to expel the fecundines or dead fœtufes. Such medicines have entirely loft their credit with modern practitioners; and if an overweening partiality to the ancients, who fo frequently report fuch virtues, can believe that they were guided by experience, there can be little doubt in alleging that they have given us numerous inftances of a falfe one.

A fixth inftance, and a very fruitful fource of falfe experience, is when effects that do really take place, are imputed to medicines employed, while they are truly owing to another caufe; and particularly when effects imputed to medicines do truly proceed from the fpontaneous operations of the animal œconomy, or of nature as we commonly fpeak. It is hardly neceffary to give as an inftance of this, the exploded opinion concerning the reunion of fractured bones, which was formerly fuppofed to be promoted by certain medicines, but it is now univerfally confidered as an inftance of falfe experience, as the effect is now judged to be entirely the operation of nature.

This perhaps might have been paffed over; but it would not have been fo proper to omit taking notice of an inftance of the fame kind which is ftill to be found in almoft every materia medica writer. It is the imputing to medicines taken in

in by the mouth, the power of promoting the cure of wounds; and accordingly a very great number of vegetables are ſtill mentioned under the title of Vulneraries. This virtue ſeems to be very often aſcribed to medicines, when hardly any other could be aſcribed to them.

It ſeems to be very generally ſuppoſed at preſent, that the cure of wounds is entirely or chiefly the work of nature, and, if accidental circumſtances ſhould not occur to hinder it, that nature will conſtantly do the buſineſs. So far are Britiſh practitioners perſuaded of this doctrine, that it is extremely unuſual for any of them to employ any internal medicine under the title of Vulneraries, or to proceed upon the ſuppoſition that any internal medicine can aſſiſt in the common cure of wounds. It is indeed poſſible, that a certain flaccidity of the part affected, may retard the ſuppuration of wounds, or may diſpoſe them to gangrene; and in ſuch caſes our practitioners employ internally the Peruvian bark; but it is the only vulnerary they uſe: And although in the liſt of vulneraries given by writers, there may be ſome medicines which might have an operation analogous to that of the bark, yet I believe this was not at all perceived by the practitioners who formerly employed them: and it is very probable, that the moſt part of the particular vulneraries recited had little power of any kind; and certainly nothing was to be expected from the injudicious and abſurd compoſitions that were offered under that title.

In how many inſtances the effects of the operations of nature have been falſely imputed to the operation of medicines, need hardly be ſaid. From the firſt beginnings of phyſic to the preſent day, it has been generally ſuppoſed that many diſeaſes are cured entirely or chiefly by the operations of nature, and that many of the cures ſuppoſed to be effected by medicine are often effected by nature alone, or perhaps either by accidental occurrences taking place in the animal œconomy, or by certain external circumſtances which have accidentally occurred; and therefore, that in innumerable inſtances the effects of medicines pretendedly founded on experience are often miſtaken and falſe.

How often this has happened, or how often it has occaſioned miſtakes in the writings on the materia medica, it is not

not neceſſary to ſay here. It will, however, be allowable to take notice of one inſtance that has, I believe, occurred in almoſt every writing upon the ſubject. This is with reſpect to the jaundice; a diſeaſe taken notice of in all ages, but whoſe nature has been underſtood only in very late times, and ſo lately that even Dr. BOERHAAVE underſtood it very imperfectly. It ſeems to be now very generally agreed, that the diſeaſe is never owing to the interrupted ſecretion of bile, but always to the after interruption of its paſſage from the liver to the duodenum.

Whether the jaundice may be produced by a reabſorption of bile that has been copiouſly poured into the inteſtines, as ſome phyſicians have thought, I would not poſitively determine; but am diſpoſed to believe, that the interruption of its paſſage already mentioned is very univerſally the cauſe of jaundice, by the reabſorption or regurgitation of the bile accumulated in the biliary ducts paſſing into the blood-veſſels. The interruption mentioned may be owing to different cauſes; but it is ſufficient to our preſent purpoſe to remark, that in ninety-nine of the hundred inſtances of the diſeaſe, the paſſage of the bile is interrupted by biliary concretions formed in the gall-bladder, and falling down into the ductus communis; and that it has eſpecially been in caſes of this kind that various medicines have been ſuppoſed to cure the jaundice: but all of them may perhaps be conſidered as inſtances of a falſe experience. We know of no medicines capable of diſſolving biliary concretions, that can be conveyed into the body ſo as to reach theſe concretions as they exiſt in the ductus choledochus communis; and of the hundred medicines which have been reported to have cured the jaundice, there is not one of them that we can conceive to have either the power of diſſolving the concretion, or of expeding its paſſage into the duodenum. Theſe reports, therefore, of their curing the diſeaſe, may be conſidered as ſo many inſtances of a falſe experience. They have been commonly owing to the fallacia cauſæ pro non cauſa. The membranes of the human body readily admit of a gradual and conſiderable extenſion; and therefore the coats of the ductus choledochus often ſuffer ſuch a dilatation as to allow biliary concretions to paſs into the duodenum. When this happens, it very ſoon puts an end to the appearance of jaundice. If, however, at the ſame time, a perſon labouring under the diſeaſe

diſeaſe had been for ſome time uſing amedicine recommended for it, the cure is imputed to this; though, for the reaſons given above, it could not truly have any ſhare in it.

A ſeventh inſtance of falſe experience is that which has ariſen from miſtakes concerning the nature of diſeaſes, which, though ſimilar in certain circumſtances, are, however, in their nature conſiderably different. Thus, in materia medica writers, there is nothing more common than the mention of the ſame remedy for the cure of diarrhœa and dyſentery. As aſtringents they may be uſeful in the former; but in the latter, eſpecially in its beginning, they are not only uſeleſs, but improper and pernicious. When, therefore, they are reported from experience to have cured the latter, it ſeems to have either from ſuppoſing a caſe of diarrhœa to be that of a dyſentery; or at leaſt from not attending to the circumſtances of the caſe, and from giving that as a general remedy which is adapted only to one particular circumſtance of the diſeaſe. This is a mode of writing on the materia medica which has introduced great confuſion and many pernicious miſtakes into the practice of phyſic.

The eighth and laſt inſtance of falſe experience that I ſhall mention, is that which has ariſen from miſtakes concerning medicines. Thus, modern writers have aſcribed virtues which they have copied from DIOSCORIDES, to medicines which are very different from thoſe to which the ancient writers had aſcribed them, though ſtill vouched by the pretended experience of the moderns.

From this view of the many inſtances of falſe experience adduced by writers on the materia medica, and which inſtances are to be found in almoſt every writer on the ſubject, it will appear that theſe writings are for the moſt part a compilation of miſtakes and falſehoods, againſt the impoſition of which a ſtudent ſhould be very much on his guard. It indeed requires more knowledge, diſcernment, and experience, than the ſtudent at the time he commonly enters upon this ſtudy can poſſibly have; but it may be of uſe to inſpire him with general doubt and diffidence: and it is hoped, that the remarks we have taken the liberty of ſuggeſting, may be in ſome meaſure uſeful both to teachers of the materia medica and to phyſicians engaged in the practice of phyſic.

Before

Before dismissing this subject, it is incumbent upon me to observe, that the writers upon the materia medica have reported the false experiences mentioned, chiefly from their mistaken judgment, and rarely under any consciousness of falsehood: But it must, however, be acknowledged, that this last has also unhappily taken place, and that many facts have been obtruded upon the public by persons conscious of their being false. This has happened sometimes from an attachment to particular theories, which their authors have desired to maintain, and have therefore often supported by pretended facts and experiments. Sometimes the same effects have been produced by an attachment to a particular method of cure, or to particular remedies which their authors supposed they had discovered or invented, and which they have often supported by facts which perhaps their prejudices have made them suppose to be true, but which they have admitted without rigorous examination of their truth, and sometimes conscious of their falsehood.

This leads me to observe, that a very fertile source of false facts has been opened for some time past. This is, in some young physicians, the vanity of being the authors of observations, which are often too hastily made, and sometimes perhaps very entirely dressed in the closet. We dare not at present be particular; but the next age will discern many instances of perhaps the direct falsehoods, and certainly the many mistakes in fact, produced in the present age, concerning the powers and virtues of medicines.

I have now said enough of the falsehoods which have prevailed, or may further prevail, in writings on the materia medica.

But, upon this subject of the investigation of medicinal virtues by experience, I must still remark, that there are several kinds of experiment which have been not very fitly employed for the purpose. One is, the giving the substances to brute animals, and observing their effects upon these. This is a very proper measure in the investigating the powers of all untried substances, and may give a proper caution with regard to the trial of the same upon the human body; but it can go no farther: for it is well known that the effects may be very different in the two subjects, as some substances act much

much more powerfully, and others more weakly, upon the human body, than upon thoſe of brutes; and therefore we can draw no certain concluſion from the effects of ſubſtances upon brute animals, till they are actually tried upon the human body.

Another mode of experiments for aſcertaining the virtue of medicines, has been by mixing them with the blood immediately drawn out of the veſſels. This has given us ſome knowledge of the nature of our fluids, and of the effects of ſome ſubſtances mixed with them in this manner. Perhaps ſome general concluſions may be drawn from theſe experiments; but materia medica writers have often drawn concluſions from them, without attending to the difference that may ariſe from the changes which many ſubſtances undergo in the firſt paſſages, before they are mixed with the blood, and without conſidering the difference between the quantities applied in theſe experiments to a ſmall portion of the blood, and of the quantities that can poſſibly be introduced by the mouth, and which are to be diffuſed in the whole of the maſs of blood. In conſequence of this, many erroneous judgments have been given by writers on the materia medica, as I ſhall mention hereafter on the ſubject of the particular medicines with reſpect to which theſe falſe judgments have been given.

A third mode of experiment employed for inveſtigating the virtues of medicines, has been by injecting them into the veins of living brutes; and ſuch experiments have been frequently made, but have afforded very few concluſions or certain inſtruction. Whatever are the effects of ſubſtances applied in this manner, they muſt be very different from what they would be if introduced into the body by the mouth; when, by the changes they muſt ſuffer in the firſt paſſages, and eſpecially from the dilution and diffuſion which they neceſſarily undergo there, cannot poſſibly have the ſame effects as when injected into the veſſels. It is proper alſo to remark, that the effects which have generally occurred in conſequence of injections into the veſſels of brutes, and particularly the coagulation produced by almoſt every thing thrown in, will, it is believed, long prevent our trying this mode of the application of medicines to the human body.

With

With reſpect to both theſe modes of experiment laſt mentioned, it muſt be obſerved, that the reſult of the experiments reported is often ſo contradictory, and ſuch want of chemical knowledge has ſo often appeared in making the experiments, that at preſent very few concluſions can be drawn from them.

We have now finiſhed the ſeveral ſubjects which ſeemed neceſſary to be conſidered as an introduction to the ſtudy of the materia medica; but before entering upon the particular ſubjects of it, I think it ſtill requiſite to ſay a few words concerning the plan moſt proper for a treatiſe of this kind, or the order in which the ſeveral ſubjects of it may be moſt properly arranged.

CHAP.

CHAPTER III.

OF THE MOST PROPER PLAN FOR A TREATISE ON THE MATERIA MEDICA.

THE order in which the ſeveral ſubjects of the materia medica have been conſidered, has been very different in different writers; and which is the moſt proper, has been diſputed about, while many are of opinion that it is of little conſequence, which of them is followed. It has generally been thought proper to follow a plan in which the ſubjects are, according to a certain affinity, brought together, ſo that a number of them might be for the purpoſe of medicines conſidered under the ſame view. Thus, Dr. BOERHAAVE conſidered them in the order of the botanical ſyſtem he had formed; and LINNEÆUS in the order of his own; in which he is followed by BERGIUS. But it will, however, be obvious, that as no botanical ſyſtem in every part of it collects plants by their natural affinities; ſo it will only be when ſuch ſyſtems have many natural claſſes and orders, that they will collect the ſubjects of the materia medica, that are at the ſame time connected by their medicinal qualities; and that conſequently this principal object cannot be obtained throughout the whole of any ſyſtem.

It has accordingly been thought proper to follow the botanical affinities, in ſo far only as theſe can be thrown into natural

natural orders; and this, therefore, has been attempted by the learned MURRAY, so far as he has yet proceeded: but from what we have said above with respect to the imperfection of the botanical affinities in pointing out a similarity of medicinal virtues, it will appear that this plan will not always unite subjects in the latter point of view; and when we consider that there are yet many plants which do not enter into any natural order, these must be disposed of in an arbitrary manner, and probably in an unconnected state. It must be owned, however, that though the scheme of botanical affinities does not entirely answer the purpose, yet it will still go a certain length, and ought not to be neglected in the subdivisions of any general plan that may be assumed.

It has been supposed by some to be a more eligible plan to unite the several substances, as they happen to be related by their sensible qualities; and this method CARTHEUSER and GLEDITSCH have attempted. This certainly may have its use; but from what is said above respecting the imperfection of this scheme for investigating virtues, it will appear that it will not always unite subjects that ought to be united under the same view; and it will be found, that in the authors mentioned who have executed it in the best manner possible, the desired effect is by no means produced.

From the difficulty of rendering any of these plans tolerably exact and perfect, some writers have deserted all of them, and thought it best to throw the several articles into an alphabetical order, as NEWMANN and LEWIS have done. If, however, there can be any advantage from bringing subjects of some affinity together, this alphabetical order is the most unfit for the purpose, as by separating similar substances, it must be perpetually distracting to the student. It can therefore have no advantage but that of a dictionary, in referring readily to any particular subject that may be inquired after; but this advantage can be obtained in every plan by means of an index, which cannot be saved even in an alphabetical work, as the different names under which the same substances are known necessarily require an index comprehending all those different names.

Similar

Similar to those of the alphabetical order, are those plans which, after arranging the several articles of the materia medica according to the parts of the plant employed, as roots, leaves, &c. have thrown these again into an alphabetical order, as ALSTON and VOGEL have done; but it is obvious that this establishes no connection between the subjects that follow one another, and can have no advantage over the alphabetical order. Further, by separating the consideration of the several parts of vegetables, it will both separate subjects that ought to be considered together, and will occasion unnecessary repetition.

After rejecting all these different plans, it will, I think, appear, that as the study of the materia medica is truly the study of the medicinal virtues, so the plan that arranges the several substances according to their agreeing in some general virtues, will be the best adapted to acquiring the knowledge of these, and will most readily inform the practitioner what different means he can employ for his general purpose. It will also inform him how far the several similar substances may differ in their degree of power, or how far from the particular qualities assigned to each he may be directed or limited in his choice.

As it seems proper that every practitioner ought, as far as possible, to practise upon general indications; so it is evident that his study of the materia medica is especially to know the several means that can answer these. Such a plan, therefore, must be the most proper for giving a student instruction; and if, while medicines are arranged according as they answer general indications, the particulars be likewise thrown together as far as possible according to their sensible qualities and botanical affinities, this plan will have the advantage of any other that has been proposed for presenting together the subjects that ought to be considered at one and the same time, and give the best means of recollecting every thing that relates to them.

Such is the plan I am to follow; and I am particularly willing that this treatise of the materia medica should be considered as giving a therapeutice, or methodus medendi, from which

which part of the medical ſyſtem the materia medica cannot properly be ſeparated. It may indeed be alleged, that as the therapeutice muſt be founded on a particular ſyſtem of phyſiology and pathology, ſo it muſt be liable to all the errors and fallacies of theſe: but every treatiſe on the materia medica which refers the virtues of medicines to general indications, muſt be expoſed to the ſame objections; and though we cannot preſume to ſay that our plan in this reſpect ſhall be without miſtakes, yet our general plan in moſt of its parts being nearly the ſame with moſt other ſyſtems, we truſt it ſhall not be very faulty: And as it is a principal purpoſe of this treatiſe to render the methodus medendi, or the eſtabliſhing of general indications, more correct, and better adapted to the particulars of the materia medica, than it has hitherto been, ſo it affords a particular reaſon for our following this plan; which in general is very much the ſame with that of Dr. BOERHAAVE in his treatiſe *De Viribus Medicamentorum*, and ſuch as has been followed by ſeveral late authors, as SPIELMAN, LOESECKE, and LIEUTAUD.

In following this plan, I ſhall have occaſion to employ ſome general terms in a ſenſe different from that of other writers: and, therefore, that I may be afterwards more eaſily underſtood, it is judged neceſſary here to give ſome explanation of theſe terms; and at the ſame time, as I ſhall be frequently obliged to mention alſo the terms employed by other writers, it is judged neceſſary likewiſe to explain in what ſenſe theſe are to be taken.

To do this properly, I think it may be of ſervice to ſtudents of the materia medica if ſome pains ſhall be taken here to explain the whole of the general terms employed by writers on this ſubject. In doing this, I ſhall, with reſpect to each term, endeavour to ſay in what ſenſe it has been commonly or particularly employed; with what propriety it has been uſed; why I do not employ it; and very often why it ſhould not be employed at all. For this purpoſe, I ſhall throw the whole of the terms into an alphabetical order, and thus give a dictionary which I hope may be uſeful and convenient for perſons entering upon the ſtudy of the materia medica. In doing this, it ſeems proper and neceſſary to give the appellations

tions as employed by Latin writers; and if upon any occasion the explanation of an English term is sought for, it will be readily found by the help of the index placed at the end of the whole work.

DICTIONARY *of the* GENERAL TERMS *employed by Writers on the* MATERIA MEDICA.

A.

ABLUENTIA, *Abluents.* Medicines ſuited to waſh off from the external or internal ſurfaces of the body, any matters improperly adhering to them. They are either water or other fluids, which can act by their fluid quality, and may be in the form of lotion, gargariſm, or injection. The term of Abluent is ſeldom employed, and more commonly that of *Abſtergent* or *Detergent*; and under theſe titles are commonly mentioned medicines which not only by their fluidity waſh off adhering matters, but ſuch alſo as are ſuppoſed to do it by their power of reſolving and looſening the coheſion of the adhering matters. In this ſenſe, however, theſe terms are too general, and therefore ought not to be employed; and when they have been employed with reſpect to the internal parts, it has generally been upon a falſe ſuppoſition of their power of reſolving viſcid ſubſtances, which we ſhall hereafter endeavour to ſhow to be commonly miſtaken.

ABORTIVA, *Abortives.* Medicines capable of occaſioning an abortion in pregnant women. Theſe medicines have been otherwiſe named Amblotica and Ecbolica; and they are commonly ſuppoſed to have alſo the power of promoting the natural birth, of forcing off the placenta, and even of expelling a dead fœtus. Theſe laſt mentioned powers, though frequently aſcribed to medicines by the ancients, ſeem to me, and perhaps to moſt phyſicians of theſe days, to be imaginary, and accordingly ſuch medicines are now hardly ever employed. There is little foundation for ſuppoſing

poſing the power of any medicines to be ſpecifically determined to the uterus; and ſeemingly there are no other abortiva than ſuch as produce their effects by a violent general operation.

ABSORBENTIA, *Abſorbents*. Dry bodies ſuited to ſuck liquids into their pores. In this general ſenſe the term is now very ſeldom employed, and is almoſt ſtrictly confined to certain earths ſuited to take acids into their pores, and at the ſame time to deſtroy their acid quality. They will be conſidered hereafter under the title of Antacida.

ABSTERGENTIA, *Abſtergents*. See Abluentia.

ACOPA. Medicines, and particularly unguents, ſuited to take off the laſſitude induced by exerciſe and labour. The term may be employed for ſome general meaſures to this purpoſe; but I know of no medicines ſuited to it, except by a general quality, and therefore would admit of no ſuch title to be applied to medicines.

ACOUSTICA. Medicines ſuited to cure deafneſs, or other defects of hearing. This is an inſtance of thoſe general terms which have confounded the materia medica and the practice of phyſic. As deafneſs, or any other diſeaſe, may depend upon different cauſes, and ſuch as may require different and even oppoſite remedies, ſtudents cannot be properly inſtructed, unleſs remedies are pointed out as ſuited to the particular cauſe and peculiar circumſtances of the diſeaſe. It is poſſible, indeed, that a practitioner may have found a deafneſs relieved or cured by a certain remedy, when he could neither aſcertain the ſtate of the diſeaſe nor the operation by which the remedy was uſeful; and I would not refuſe to mark ſuch facts: but while matters are on that footing, they can only lead to a random empirical practice, which every body knows has been not only uſeleſs but frequently hurtful. Such general terms, therefore, as *acouſtics*, ſerve to miſlead rather than inſtruct, and ſhould never be employed.

AGGLUTINANTIA, *Agglutinants*. Medicines ſuited to cement and reunite ſoft parts preternaturally ſeparated, and therefore employed in wounds and ulcers; but our Britiſh

ſurgeons neither know ſuch medicines, nor employ any ſuppoſing them to be ſuch. They ſuppoſe the buſineſs to be entirely the work of nature, and their own function to be only the removing any impediments that may occur to that.

The term of Agglutinants has alſo been employed by QUINCY, and perhaps ſome others, for medicines ſuited to ſupply the vacuities formed by the abraſion of the ſolid parts, either produced by the conſtant motion of the fluids over them, or perhaps by the motion of the ſolid parts upon one another; but the ſuppoſition of the diſeaſe is upon a very doubtful theory, and the ſuppoſition of the operation of the medicines is not leſs ſo. If the term has any foundation at all, it muſt be upon the ſame with that of nutrient; and there is no propriety in employing a doubtful theoretical term.

ALEXIPHARMACA, *Alexipharmics.* Medicines ſuppoſed fit to preſerve the body againſt the power of poiſons, or to correct and expel thoſe taken into the body. The ſame are mentioned alſo under the titles of *Alexiteria* and *Antidota*; and upon the ſuppoſition of their being fitted to expel the poiſon of animals, alſo named *Theriaca.* In our hiſtory of the materia medica, we have ſaid that the ſtudy of poiſons and of antidotes appeared very early among the phyſicians of Greece and Rome, and continued to be a great part of their ſtudy ſo long as the Greek phyſic laſted: from whence the number of antidotes and theriacas ſo frequently mentioned in thoſe ancient writers. We have likewiſe in the ſame place taken notice of the injudicious compoſitions by which the ancients attempted the correction of poiſons, and with reſpect to which hardly any body now-a-days doubts of their having been as unſucceſsful as they were injudicious; and therefore it may now be ſaid that the terms were very improperly employed.

The modern phyſicians, however, and particularly the Galeniſts, adopting very much the ideas of the ancients, have therefore continued their medicines; and the moderns have further transferred the notion from the caſe of poiſons evidently taken into the body, to the caſe of noxious powers frequently taken in from contagion, or otherwiſe ariſing

arising in the body. With regard to these, therefore, they have supposed that the cure of the disease arising from them was to be obtained by the correction and expulsion of the morbific matter; and the medicines suited to this purpose they have often given under the titles of *Alexipharmics* and *Alexiterials*.

How little foundation, however, there is for the greatest part of this theory, I have endeavoured to show in another place. See *First Lines of the Practice of Physic*. And whatever may become of my general doctrine, I cannot perceive that the medicines given under the titles of *Alexipharmics* and *Alexiterials*, are any ways peculiarly suited to expel morbific matter. In so far as they are anywise suited to that purpose, they are diaphoretics or sudorifics; and as generally stimulant and heating medicines, they are to be employed with great caution. The terms of *Alexipharmic* and *Alexiterial* should therefore be expunged from the writings on the materia medica: for though the medicines enumerated under these titles may be truly useful, their being given under the false idea which the general terms imply, may induce an erroneous practice; and in former times they generally did establish that pernicious practice which cost Dr. SYDENHAM so much pains and trouble to correct.

ALEXITERIA. See the title of Alexipharmaca above.

ALLIOTICA, more commonly named ALTERANTIA, *Alteratives*. Medicines suited to change the condition of the mass of blood, particularly from a morbid to a sound state, and frequently employed for medicines suited not only to correct but to clear the blood from certain impurities supposed to remain in it. With what propriety, and in what sense, the term may be employed, we shall in the sequel have occasion fully to explain.

ALOEDARIA et ALOETICA, *Aloetics*. Compound medicines which receive aloes as a principal ingredient.

ALOEPHANGINA. Medicines formed by a combination of aloes and aromatics.

ALTERANTIA. See above Alliotica.

ALVIDUCA, *Openers of the Belly.* Medicines ſuited to promote the natural evacuation by ſtool, otherwiſe named LAXANTIA, *Laxatives.* The propriety of ſuch terms, and the limits to be ſet to them, will be fully conſidered hereafter in our treatiſe on the materia medica, under the title of Cathartica.

AMBLOTICA. See above the title Abortiva.

ANACATHARTICA. Medicines purging upwards, and ſometimes employed for emetics, ſometimes for ſalivants, but moſt commonly implying, according to the original ſenſe in which the term was employed by HIPPOCRATES, *Expectorants*, or medicines promoting the ejection of matter from the lungs, whether mucous or purulent. With what propriety and ſtrict meaning the term may be employed, will be conſidered hereafter under the title of Expectorants.

ANALEPTICA, *Reſtoratives.* Medicines ſuited to reſtore the force of the body when loſt, and ſometimes employed with reſpect to ſtimulants, but more commonly with reſpect to thoſe ſubſtances which ſupply a deficient nouriſhment. As a term, however, attended with ſome ambiguity, it ſhould not be employed at all.

ANAMNESTICA. Medicines ſuppoſed to improve the memory, or to reſtore it when loſt. A general title which ſeems to have no foundation at all, or although it had, would, as too general, be very improperly employed. See Acouſtics.

ANAPLEROTICA. Medicines ſuppoſed to ſupply the loſs of ſubſtance in the whole, or in particular parts; as in wounds or ulcers. In the former caſe, it is improper, as of no defined operation; and in the latter caſe, the ſurgeons know well how improperly ſuch a general term is employed.

ANASTOMOTICA. A term of the ſame meaning with that of Aperientia; which ſee hereafter. When, however, the

the term of Anaſtomotica is eſpecially employed, it implies medicines ſuited to open the extreme orifices of blood-veſſels.

ANODYNA, *Anodynes.* Medicines ſuited to relieve pain. It might be a general term, comprehending every means of relieving pain, and ſo far might be faulty; but as now generally employed for thoſe means only which relieve pain by diminiſhing or deſtroying ſenſibility, it may be allowable.

ANTACIDA, *Antacids.* Medicines ſuited to correct and neutralize acids. Of how many different kinds theſe are, and to which of them the term is properly applied, we ſhall endeavour to ſay hereafter in our treatiſe, in which the term again occurs.

ANTACRIA, *Antacrids.* Medicines ſuited to correct acrimony, either in the whole ſyſtem or in particular parts of it. To what medicines this title is properly applied, we ſhall ſay hereafter in the following treatiſe.

ANTALKALINA, *Antalkalines.* Medicines ſuited to correct alkaline ſalts, or alkaline matters in the whole body, or in particular parts. In what ſenſe the term of Antalkalines may be properly employed, we ſhall explain hereafter under that title in the materia medica.

ANTAPHRODISIACA, or ANTAPHRODITICA. Medicines ſuppoſed to check or extinguiſh venereal deſires. It is doubtful if there be any medicines of ſpecific power for this purpoſe; and if there be remedies or medicines which have theſe effects, it is by anſwering particular indications, under the titles of which only they ought to be mentioned, and not under a general term of no defined operation.

ANTASTHMATICA. Medicines ſuppoſed to cure aſthma, or in general to relieve difficult breathing. With reſpect to this and all the other titles in which the word *anti*, connected with that of a particular diſeaſe or morbid function, is employed, the ſame obſervation is to be made that was made above under the title of Acouſtic.

The

The meaning of the terms in which the word *anti* is employed may be commonly underſtood; but for the ſake of the unlearned I ſhall repeat them here, with a ſhort explanation of their meaning.

ANTEMETICA. Medicines ſuited to cure a preternatural vomiting.

ANTHELMINTICA, *Anthelmintics.* Medicines ſuited to poiſon worms in the alimentary canal, or to expel them from thence. As we cannot always diſtinguiſh whether our anthelmintics operate in the one way or in the other, and as ſeveral of them may be ſuppoſed to operate in both ways at the ſame time, the general term may for the moſt part be retained; though it is to be deſired that we could diſtinguiſh between the proper anthelmintics and the violent purgatives.

ANTHYPÓCHONDRIACA. Medicines ſuited to cure hypochondriaſis.

ANTHYPNOICA. Medicines ſuited to diſpel ſleep.

ANTICACHECTICA. Medicines fitted to cure cachexy.

ANTICOLICA. Medicines ſuited to cure the colic.

ANTIDINICA. Medicines ſuited to cure giddineſs.

ANTIDOTA, *Antidotes* Medicines ſuited to oppoſe or deſtroy the power of poiſons taken into the body. See above Alexipharmaca.

ANTIDYSENTERICA. Medicines ſuited to cure dyſentery.

ANTIFEBRILIA. Medicines ſuited to cure fever.

ANTIHECTICA. Medicines ſuited to cure hectic fever.

ANTIHYSTERICA. Medicines ſuited to cure hyſteria and hyſteric diſeaſes.

ANTILOIMICA.

ANTILOIMICA. Medicines which preſerve againſt the plague.

ANTILYSSUS. A medicine ſuited to cure the rabies canina in men or in brutes.

ANTINEPHRITICA. Medicine ſuited to cure the gravel, or other diſeaſes of the kidneys.

ANTIPARALYTICA. Medicines ſuited to cure the palſy.

ANTIPHARMACA. Medicines ſuited to reſiſt poiſons.

ANTIPHLOGISTICA. Medicines or remedies ſuited to reſiſt, diminiſh, or cure, inflammation, or an inflammatory ſtate of the ſyſtem.

ANTIPHTHISICA. Medicines ſuited to reſiſt and cure phthiſis or conſumption.

ANTIPLEURITICA. Medicines ſuited to cure pleuriſy.

ANTIPODAGRICA. Medicines ſuited to cure the gout.

ANTIPYRETICA. The ſame with Antifebrilia.

ANTIQUARTIUM. Medicines ſuited to cure quartan fever.

ANTISCOLICA. The ſame with Anthelmintica.

ANTISCORBUTICA. Medicines ſuited to cure ſcurvy; but frequently applied particularly to medicines of the claſs tetradynamia.

ANTISEPTICA. Medicines ſuited to reſiſt or correct putrefaction.

ANTISPASMODICA. Medicines ſuited to cure ſpaſmodic affections. A title certainly faulty as a general one; but it is difficult to reduce it to the particular operations comprehended

ed under it. We ſhall, however, endeavour to do this afterwards.

ANTITOXICA. The ſame with Antipharmaca and Antidota.

ANTIVENEREA might be the ſame with Antaphrodiſiaca; but for the moſt part it is only employed for medicines ſuited to cure the lues venerea, or ſome of its ſymptoms; and as too general, it is certainly improper.

APERIENTIA, *Aperients.* Medicines ſuited to open obſtructed paſſages, and particularly to open and reſtore ſuppreſſed excretions or evacuations, and moſt commonly applied to medicines ſuited to open the veſſels of the uterus, and thereby to excite the retained, or to reſtore the ſuppreſſed, menſtrual flux. The term, therefore, as variouſly employed, both with reſpect to different caſes and to different manners of operating, is, without ſpecifying the particular caſe and operation, extremely improper. It has farther been too often employed with reſpect to certain medicines, whoſe power of anſwering the purpoſe propoſed is extremely doubtful.

APHRODISIACA. Medicines ſuppoſed to be ſuited to excite the venereal appetite, or to increaſe the venereal powers. I do not know that there are any medicines of ſpecific power for theſe purpoſes; and therefore the term ſeems to have been for the moſt part very improperly employed.

APOCRUSTICUM. The ſame with Repellent.

APOPHLEGMATIZONTA, APOPHLEGMATIZANTIA, and APOPHLEGMATICA. Medicines ſuited to excite the excretion of mucus from the ſchneiderian membrane, and they are of two kinds; as the evacuation is made from the noſe, when they are named *Errhines*; or as the ſame is made from the mouth, when they are named *Maſticatories*.

ARCHEALIA. Medicines ſuppoſed to be agreeable to the imaginary archeus in the ſyſtem of VAN HELMONT, and is a term which has been adopted by the Stahlians upon the moſt imaginary and viſionary footing, but it is not likely to be more heard of in the writings of phyſicians.

ARISTOLOCHICA,

ARISTOLOCHICA. Medicines ſuited to promote the evacuation of the lochia in child-bearing women. The propriety of ſuch a term will be conſidered hereafter under the title of Menagoga, in its proper place.

ARTERIACA. Medicines ſuited to relieve the diſeaſes, or promote the functions, of the aſpera arteria or trachea. A term conveying no preciſe meaning, and therefore improper.

ARTHRITICA. Medicines ſuited to cure the diſeaſes of the joints, particularly the gout. It is a term of ſo vague and of ſo undetermined a meaning as to be altogether improper.

ASTRINGENTIA, *Aſtringents*. Medicines ſuited to increaſe the coheſion, and produce ſome contraction in the ſimple ſolids and moving fibres of the human body. Their manner of operating, and their effects, will be more fully conſidered hereafter in their proper place.

ATTENUANTIA, *Attenuants*. Medicines ſuppoſed to diminiſh the conſiſtence of the animal fluids, either by dividing coherent maſſes, or by diminiſhing the ſize of the larger particulars. With what propriety any medicines can be ſuppoſed to do this, will be conſidered hereafter; and I expect to ſhow that the ſuppoſition is falſe, and the term therefore improper.

ATTRAHENTIA. Medicines ſuppoſed to draw the fluids in greater quantity than uſual towards the part to which the medicine is applied. A power that may be fairly ſuppoſed in certain medicines, but will be more properly expreſſed by a term pointing out the operation by which the medicine produces its effect.

B.

BASILICA. A quackiſh term applied to medicines ſuppoſed to be of noble or royal power; but as ſuch terms are ſuited to deceive, and commonly have deceived the world, they are therefore unworthy of public ſocieties.

BECHICA

BECHICA. Medicines ſuited to relieve a cough; which, as they may be of various kinds, the general term may miſlead, and is therefore improper.

BEZOARTICA. Medicines ſuppoſed to have the virtues of bezoar, and chiefly thoſe of expelling morbific matter. As theſe, however, ſuppoſed peculiar to that ſubſtance, were imaginary and ill founded, ſo the extenſion of the term to other ſubſtances or preparations is fallacious and improper.

C.

CALEFACIENTIA. Heating medicines, or thoſe which increaſe the heat of the body. Whether there are any of this quality that act otherwiſe than by increaſing the motion of the blood, and therefore by increaſing the action of the heart and arteries, will be conſidered hereafter under the title of Stimulants.

CARDIACA, *Cordials*. Medicines ſuited to increaſe the action and vigour of the heart. This is the ſtrict meaning of the term; but it has been extended to every means of increaſing, and eſpecially to thoſe of ſuddenly increaſing, the activity of the ſyſtem; in which caſe the term may not have the neceſſary preciſion.

CATAGMATICA. Medicines ſuited to aſſiſt the reunion of fractured bones. A power which is not certainly known to exiſt in any medicine whatever, and therefore the term is falſely employed.

CATHÆRETICA. Medicines ſuited to cleanſe foul ulcers; but as the operation of the different medicines employed for this purpoſe is not always the ſame, nor their different operation well explained, the propriety of the general term may be doubtful.

CATHARTICA. Medicines ſuited to increaſe the evacuation by ſtool. The various operation of theſe, and therefore the various application of the term, will be conſidered hereafter in its proper place.

CAUSTICA.

CAUSTICA. Medicines ſuited to deſtroy the mixture and texture of animal ſubſtances. As a metaphorical term taken from the operation of actual fire, it is not ſtrictly proper; but as now univerſally employed, it may ſtill be allowed.

CEPHALICA. Medicines ſuited to relieve or cure the diſeaſes of the head. However frequently employed, ſuch a general meaning is enough to ſhew the abſolute impropriety of the term. It has been propoſed to limit it to a more preciſe meaning, and to apply it to ſuch medicines as have the power of increaſing the energy of the brain, and the activity of the nervous ſyſtem; but it has been applied in this manner without any proper diſtinction and preciſion; and till we can do this, the term would be better laid aſide.

CHOLAGOGA. Purgative medicines ſuppoſed to evacuate eſpecially, or as the language is elective, bile; but as ſuch a peculiar power in any medicine cannot be clearly aſcertained, the term has been properly long ago laid aſide.

CICATRIZANTIA, *Cicatriſers.* Medicines ſuited to induce a cicatrice, or new ſkin upon wounds and ulcers. As it is extremely doubtful if ſuch a power in any medicine exiſts, the propriety of the term may be juſtly queſtioned.

CONSOLIDANTIA. Medicines ſuited to give firmneſs and union to growing parts in wounds and ulcers.

COSMETICA, *Coſmetics.* Medicines ſuppoſed to improve the beauty of the face, or to reſtore it when any how loſt. The indication is to be anſwered by medicines of different, and even contrary, qualities; and therefore the general term is improper, and as ſuch it has done much miſchief.

D.

DEMULCENTIA, *Demulcents.* Medicines ſuited to correct acrids, or to obviate the irritation ariſing, or that might ariſe, from them. What are the medicines that may anſwer this purpoſe we ſhall conſider hereafter.

DEOBSTRUENTIA,

DEOBSTRUENTIA, *Deobſtruents.* Medicines ſuited to remove obſtructions which have taken place in any of the veſſels of the body. As a general term, it is improper; and as commonly employed for medicines which are ſuppoſed to remove the obſtructions depending upon a matter filling up the veſſels, it is commonly upon a falſe foundation, and therefore abſolutely improper.

DEOPPILANTIA, *Deobſtruents.* Suppoſed to act in the manner laſt mentioned, and therefore upon a very doubtful foundation.

DEPILATORIA. Medicines ſuited to make the hair fall off from the places upon which it grows.

DEPURANTIA. Medicines ſuppoſed to correct or evacuate the impurities which upon any occaſion prevail in the body; but as no ſuch ſpecific power can be ſuppoſed in any particular medicine, the general term is groundleſs and extremely improper.

DIAPHORETICA. Medicines ſuited to excite or promote the inſenſible perſpiration uſually made from the ſkin. The term has been often employed for medicines ſuited to excite or promote ſweat; and there are perhaps no exact limits to be put between the diaphoretica and ſudorifera; or, ſo far as there is, the diaphoretica are employed for thoſe medicines which promote the evacuation only in the inſenſible form.

DIAPNOICA. A term more ſtrictly employed for medicines which act in the more gentle manner we have juſt now ſaid of the diaphoretica.

DIGERENTIA and DIGESTIVA. Medicines ſuppoſed to promote the production of a proper, or, as the language commonly is, a laudable pus, in wounds and ulcers. There are certainly various medicines which ſeem to anſwer this purpoſe; but whether they directly contribute to this, or only correct thoſe circumſtances which impede the operation of nature, is a little uncertain; and therefore it is doubtful whether the general term be proper or neceſſary.

DILUENTIA,

DILUENTIA, *Diluents*. Medicines which increaſe the fluidity of the blood, by increaſing the proportion of fluid parts in it. This is the preciſe idea of diluents; and if the term is applied to ſubſtances, which by other means increaſe the fluidity of the blood, it ſeems to be very improperly employed.

DISCUTIENTIA, *Diſcutients*. Medicines ſuppoſed to diſpel tumour or hardneſs. The operation of ſuch medicines ſeems to be of different kinds, and therefore the general term ſhould, if poſſible, be avoided.

DIURETICA. Medicines ſuited to promote or increaſe the ſecretion of urine. A term to be more fully conſidered hereafter.

E.

ECBOLICA. A term of the ſame meaning with Abortiva.

ECCOPROTICA. Purging medicines of the gentler kind, or, ſtrictly, medicines which promote the natural evacuation by ſtool.

EMETICA. Medicines which excite vomiting. To what different ſubſtances the term may be applied, will be conſidered hereafter in our treatiſe on the materia medica.

EMOLLIENTIA. Medicines which diminiſh the force of coheſion in our ſimple ſolids, and therefore ſoften and diminiſh the hardneſs and rigidity of the parts to which they are applied. Their manner of operating, and how far they operate on the moving fibres, is to be conſidered more fully hereafter.

EPISPASTICA. Medicines which draw the fluids more copiouſly into the parts to which they are applied, and therefore ſtrictly a term of the ſame meaning with that of attrahentia; but as the effect of the epiſpaſtica is commonly that of exciting bliſters, the term is often employed for thoſe of veſicantia and veſicatoria.

EPULOTICA.

EPULOTICA. A term of the ſame meaning with that of Cicatrizantia.

ERODENTIA. Medicines which deſtroy the texture of our ſimple ſolid, and render a part of them therefore ready to be ſeparated from the reſt, in the manner to be hereafter more clearly explained.

ERRHINA. Medicines ſuited to promote the evacuation of mucus from the internal membrane of the noſe. The term is to be more fully conſidered hereafter.

ESCHAROTICA. A term of the ſame meaning with that of Erodentia; or how far different, will be conſidered hereafter.

EVACUANTIA. Medicines ſuited to promote the natural excretions, or in any other way to draw fluids out of the body.

EXPECTORANTIA. Medicines ſuited to promote the excretion or rejection of mucus or pus from the lungs. What extent may be given to the meaning of this term, will be conſidered hereafter in its proper place.

F.

FEBRIFUGA. Medicines ſuited to prevent or cure fever. A term which, however properly it might have been formerly admitted, cannot now be employed but in a vague and undetermined meaning, and therefore moſt improperly.

G.

GALACTOPHORA. Medicines ſuppoſed to increaſe the production of milk in the human body, and to determine it more copiouſly to the breaſts of females. As we cannot perceive that any medicines are poſſeſſed of ſuch a quality, we muſt judge the term to be without foundation, and therefore improperly employed.

H.

HEPATICA. Medicines ſuppoſed to be ſuited to cure the diſeaſes of the liver; but as I do not know of any medicines which either can be particularly directed to that viſcus, or which have any power of promoting the motion of the fluids in it, or which are poſſeſſed of any quality and ſpecific power of promoting the ſecretion of bile, we judge the power of ſuch medicines to be imaginary, and the term abſolutely improper.

HUMECTANTIA. Medicines ſuited to moiſten the ſolids of the body, and therefore of nearly the ſame meaning with Emollientia, as we ſhall explain more fully hereafter.

HYDRAGOGA. Medicines ſuppoſed electively to carry off water by ſtool. What foundation there is for ſuppoſing any purgatives poſſeſſed of ſuch a power, we ſhall conſider hereafterunder the title of Cathartica.

HYDROTICA. A term of the ſame meaning with that of Sudorifica, or Sudorifera.

HYPNOTICA. Medicines capable of inducing ſleep. Whether there are any medicines which have this power, but by a more general operation, and therefore to be marked by a more general term, we ſhall conſider hereafter under the title of Sedatives.

I.

IMMUTANTIA. Of the ſame meaning with that of Alterantia.

INCIDENTIA. Medicines ſuppoſed to divide, or as it were to cut through the particles of our fluids, or to ſeparate any number of theſe particles preternaturally cohering together. A power of medicine which, as mechanical, I take to be quite imaginary, as we ſhall endeavour to prove hereafter

when we ſhall conſider the power of medicines acting upon the fluids.

INCRASSANTIA. Medicines ſuppoſed to have a power of thickening the conſiſtence of our fluids. How far there is a foundation for the uſe of ſuch a term, or in what ſenſe to be underſtood, we ſhall conſider hereafter.

INDURANTIA. Medicines ſuppoſed to harden the ſolid parts. How far, or in what ſenſe, ſuch a power in medicines can be ſuppoſed, ſhall be ſaid hereafter under the title of Aſtringents.

L.

LACTIFUGA. Medicines ſuppoſed to have the power of diſpelling milk collected in the breaſts of females. It cannot be readily admitted that any medicines have a ſpecific power in this reſpect; and if there are any that can produce the effect, it muſt be by a more general operation, and by the terms adapted to that the vis lactifuga ſhould be expreſſed.

LAXANTIA. A term that may be employed in the ſame ſenſe with that of Emollientia; but the term is now more commonly employed for thoſe medicines, Angl. *Laxatives*, which in a gentle manner promote the evacuation by ſtool.

LENIENTIA. Medicines ſuited to abate irritation and its effects, and particularly by correcting the quality of the irritating matter.

LITHONTRIPTICA. Medicines ſuppoſed to diſſolve ſtony concretions exiſting in the urinary paſſages. It is ſtill, I think, a queſtion whether any medicine given by the mouth has ſuch a power: and although I would not with any confidence determine againſt the poſſibility of ſuch a power, I muſt acknowledge that I am very doubtful if there be any ſuch; and I am certain that in moſt inſtances it has been falſely ſuppoſed by writers on the materia medica.

M.

M.

MATURANTIA. Medicines ſuppoſed to favour the production and complete formation of pus in inflammatory tumours. There are certainly means which may be employed for favouring theſe operations of nature; but as it cannot be admitted that any medicines are endowed with any ſpecific power to this purpoſe, the term as applied to medicines ſeems to be quite improper.

MELANAGOGA. Medicines ſuppoſed to have a power of elective carrying off *atrabilis* by ſtool. Though we ſhould admit with the ancients and Dr. BOERHAAVE, the exiſtence of ſuch an humour, we would refuſe to admit ſuch an elective quality in any purgative, and therefore the propriety of any ſuch term; but the objection to this becomes much ſtronger when we can deny the exiſtence of any ſuch humour in the body.

MENAGOGA and EMMENAGOGA. Medicines ſuited to promote the menſtrual flux in women, or to excite and reſtore it when retained or ſuppreſſed. We cannot abſolutely deny ſuch a power in medicine, and therefore the uſe of the term; but I would have it cautiouſly admitted, as I am of opinion that in a hundred inſtances it has been employed without reaſon. More of this, however, hereafter in its proper place.

MUNDIFICANTIA. Medicines ſuited to clean ulcers from any impurities adhering to them. The meaning of the term is nearly the ſame with that of detergentia and cathæretica, and the moſt general term is always the leaſt proper.

N.

NEPHRITICA. Medicines ſuited to cure the diſeaſes of the kidneys. A term, as too general, abſolutely improper.

NERVINA. Medicines ſuited to relieve the diſeaſes or correct the diſorders of the nervous ſyſtem. The obſcurity that

ſtill attends the mode of the operation of medicines upon the nervous ſyſtem, might excuſe this term; but it ſeems to be more general than neceſſary, and we ſhall never get the better of the obſcurity mentioned till more preciſion is attempted upon the ſubject.

NUTRIENTIA. Subſtances ſuited to be converted into the fluids and ſolids of the body.

O.

OBTUNDENTIA. Medicines ſuited to cover or blunt the acrimony of the fluids. With reſpect to the propriety of the term, ſee the article Demulcentia in our after treatiſe.

OBVOLVENTIA. The ſame with Obtundentia.

ODONTALGICA. Medicines ſuited to relieve the tooth-ach. This and the three following terms, as too general, are abſolutely improper.

ODONTICA. Medicines ſuited to relieve the diſeaſes of the teeth.

OPHTHALMICA. Medicines adapted to the diſeaſes of the eyes.

OTICA. Medicines ſuited to the diſeaſes of the ears.

P.

PANCHYMAGOGA. Medicines ſuited to evacuate by ſtool humours of all kinds.

PAREGORICA. A term of the ſame meaning with that of Anodyna.

PECTORALIA. Medicines ſuited to the diſeaſes of the breaſt. Employed in that general ſenſe it is abſolutely improper, and has certainly led to abuſe. As it is at preſent commonly

commonly employed in the ſame ſenſe as the term of Expectorantia, it perhaps might be allowed; but certainly the latter term, as more preciſe, ought to be the one commonly made uſe of. If the Pectoralia may, with Mr. LIEUTAUD, be of three kinds, Demulcentia, Aſtringentia, and Reſolventia, it will be very obvious that the general term may be liable to much abuſe.

PHAGEDÆNICA. Of the ſame meaning with Erodentia.

PHLEGMAGOGA. Medicines ſuppoſed to have an elective power of evacuating pituitous matter by ſtool. See above the title Cholagoga.

PNEUMONICA and PULMONICA. Medicines adapted to the diſeaſes of the lungs. Terms which, like other vague and general ones, ſhould certainly be avoided.

PSILOTHRA. A term of the ſame meaning with Depilatoria.

PTARMICA. Of the ſame meaning with Errhina.

R.

REFRIGERANTIA. Medicines ſuited to diminiſh the heat of the body. The propriety and preciſe meaning of the term will be conſidered hereafter in the article of Sedantia.

REPELLENTIA, REPERCUTIENTIA, and REPRIMENTIA. Medicines ſuited to diminiſh the influx of the fluids into the parts to which the medicines are applied, or to drive backwards the fluids already in theſe parts. Terms, however, in whatever ſenſe employed, too general, and therefore improper; but they will be conſidered more fully hereafter under the article of Aſtringents.

RESOLVENTIA. A term often employed in the ſame ſenſe as that of Diſcutientia, for medicines ſuited to remove theſe external tumours ſuppoſed to depend upon obſtruction;

on; but ſo far as employed either externally or internally, they are ſuppoſed to have their effects by deſtroying the coheſion of concreted fluids. The term appears to be employed upon a very uncertain foundation.

RESTAURANTIA. A term for medicines ſuited to reſtore loſt ſtrength; but commonly applied to thoſe which reſtore that loſs of ſtrength depending upon the waſte of fluids, and in that ſenſe nearly the ſame with the term of Nutrientia; which ſee above.

ROBORANTIA, *Strengtheners.* Medicines ſuited to ſtrengthen the body, and therefore to reſtore the ſtrength when it has been loſt. As a general term it may be improper; but as it is commonly employed for medicines which increaſe the tone of the moving fibres, it may be allowable.

RUBEFACIENTIA. Medicines which applied to the ſkin produce a redneſs, and excite ſome degree of inflammation on it. See the further conſideration of this under the title of Stimulantia in the materia medica.

S.

SARCOTICA. Medicines ſuited to produce or to favour the growth of the fleſh in wounds and ulcers. As the power of any medicine to this purpoſe is very doubtful, the propriety of the term muſt alſo be ſo.

SEDANTIA, *Sedatives.* Medicines ſuited to diminiſh the motions, and power of motion, in the body. What medicines may be comprehended under this title, will be conſidered hereafter in its proper place.

SIALAGOGA. Medicines ſuited to excite and increaſe the ſecretion of ſaliva. A title to be conſidered more fully hereafter.

SISTENTIA. Medicines adapted to diminiſh or ſuppreſs increaſed evacuations. A term manifeſtly too general and improper.

SOMNIFERA

SOMNIFERA and SOPORIFERA. Terms of the ſame meaning with that of Hypnotica.

SPLENETICA. Medicines ſuppoſed to relieve the diſeaſes of the ſpleen. See our reflections upon the term hepatica, which are more certainly applicable here.

STERNUTATORIA. Medicines fitted to excite ſneezing.

STIMULANTIA, *Stimulants*. Medicines fitted to excite the action of moving fibres, and in general the active powers of the ſyſtem. A general term, admiſſible and neceſſary in our treatiſe on the materia medica, in which the various operation of ſuch medicines is particularly explained.

STOMACHICA. Medicines ſuited to excite and ſtrengthen the action of the ſtomach. I have been at a loſs to determine how far this term ſo frequently employed could be properly rejected; but I am perſuaded that it ought to be ſo, for the ſame reaſon as other too general terms.

SUPPURANTIA. A term employed with reſpect to inflammatory tumours in the ſame ſenſe with that of Maturantia, and equally improper; but it is alſo employed with reſpect to wounds and ulcers, for medicines ſuited to produce pus in theſe: but as any ſpecific power in medicines to this purpoſe can hardly be admitted, the term in this ſenſe muſt be improper.

T.

TEMPERANTIA. A term of looſe and uncertain meaning, ſometimes uſed in the ſame ſenſe as the term Refrigerantia, for medicines ſuited to diminiſh the heat, and thereby the activity, of the ſyſtem; ſometimes in the ſame ſenſe as the term demulcentia, for medicines ſuited to correct or cover the matters which give irritation; and ſometimes, according to Mr. LIEUTAUD, for medicines which carry noxious and irritating matters out of the body: but after thus obſerving that it may be employed with ſuch different meanings, it cannot be doubted that this term is one of the moſt vague and improper general terms. Whoever reads the work

work of Mr. LIEUTAUD will find, that the uſe of this term frequently occaſions much ambiguity.

THERIACA. Medicines ſuited to reſiſt or to obviate the effects of poiſons from the bites of venomous animals. A term introduced by the ancients upon a very falſe ſuppoſition, and continued by the moderns upon no better grounds, in the ſame ſenſe as the terms of Alexipharmaca, and Alexiteria. But with the abſurd compoſitions which have ſo long diſgraced our pharmacopœias, and to which the term has been applied, the term itſelf ſhould alſo be rejected.

THORACICA. Medicines adapted to the cure of the diſeaſes of the thorax. A term as faulty and improper as the terms of Pectoralia and Pulmonica; upon which we have obſerved above.

TRAUMATICA. Of the ſame meaning with the term Vulneraria; which ſee below.

TYLLOTICA. Of the ſame meaning with the term Catagmatica; which ſee above.

U.

UTERINA. Medicines ſuited to cure the diſeaſes of the uterus. A term much too general to be admitted.

VULNERARIA. Medicines ſuited to favour and promote the cure of wounds. As the cure of wounds muſt be very entirely an operation of nature, the ſurgeon has hardly any other employment in this buſineſs than to avoid or remove the circumſtances which might impede the operation of nature. When ſuch circumſtances occur with reſpect to recent wounds, it is very doubtful if any internal medicines can be of uſe to obviate or remove them; and at leaſt it is not probable that the medicines given under the title of Vulneraries can have any effect to this purpoſe. It is therefore that the ſurgeons of Britain omit entirely the employment of ſuch medicines; and it is ſurpriſing that foreign ſurgeons do ſtill employ them, and the abſurd compoſitions of them, which have been propoſed. It is alſo ſurpriſing, that even

even late writers on the materia medica ſhould ſo frequently continue the uſe of an indefinite and commonly ill founded term. It is indeed poſſible that the Peruvian bark, and other analogous ſubſtances, may in ſome caſes be of uſe in mending the weakneſs of the ſyſtem, and therefore the flaccidity of the parts affected; and perhaps in other caſes ſome internal medicines may be of uſe; but they ſhould be mentioned as anſwering a particular indication, and by no means under the indefinite term of Vulneraries.

Having now explained my terms, I think it proper to preſent a general view of the whole ſubject of my Treatiſe in the following Table; and to ſuperſede repetitions which might otherwiſe be afterwards neceſſary, it may be proper to give a methodical Catalogue of the particular aliments and medicines of which we are afterwards to treat. In both theſe parts of my work, it is for obvious reaſons neceſſary to employ the appellations of the Latin language.

MATERIÆ MEDICÆ TABULA GENERALIS,

In qua Medicamenta ad Capita quædam ſecundum indicationes morborum curatorias quibus reſpondent, referuntur.

MATERIA MEDICA conſtat ex

- NUTRIMENTIS quæ ſunt, P. I.
  - *Cibi*, Sect. I.
  - *Potus*, S. II.
  - et quæ cum his aſſumuntur *Condimenta*, S. III.
- MEDICAMENTIS quæ agunt in P. II.
  - Solida.
    - Simplicia.
      - *Aſtringentia*, Cap. I.
      - *Tonica*, C. II.
      - *Emollientia*, C. III.
      - *Erodentia*, C. IV.
    - Viva.
      - *Stimulantia*, C. V.
      - *Sedantia.*
        - *Narcotica*, C. VI.
        - *Refrigerantia*, C. VII.
      - *Antiſpaſmodica*, C. VIII.
  - Fluida.
    - Immutantia.
      - Fluiditatem.
        - *Attenuantia*, C. IX.
        - *Inſpiſſantia*, C. X.
      - Miſturam.
        - Acrimoniam corrigentia.
          - In genere
            - *Demulcentia*, C. XI.
          - In ſpecie
            - *Antacida*, C. XII.
            - *Antalkalina*, C. XIII.
            - *Antiſeptica*, C. XIV.
    - Evacuantia.
      - *Errhina*,

Evacuanti. *Errhina*, C. XV.
Sialagoga, C. XVI.
Expectorantia, C. XVII.
Emetica, C. XVIII.
Cathartica, C. XIX.
Diuretica, C. XX.
Diaphoretica, C. XXI.
Menagoga, C. XXII.

CATA-

CATALOGUS rerum ſpecialium ex quibus conſtat MATERIA MEDICA.

Secundum ordinem Tabulæ præcedentis et quibus ſingulis apponuntur: 1mo, *Nomen Pharmaceuticum*, ſive quo in Pharmacopœis publicis et in Pharmacopolarum officinis plerumque inſignitur. 2do, *Nomen Botanicum*, ſive Plantarum genericum et ſpecificum triviale in Syſtemate Linneano nunc autem ad paginas Syſtematis Vegetabilis Linneani ab illuſtr. Andrea Murray, ann. 1784, editi relatum, ubi nomen ſpecificum cum differentia ſpecifica inveniri poteſt. 3tio, *Nomen Anglicanum.*

PARS I. NUTRIMENTA.

SECTIO I. CIBI.

1. EX VEGETABILIBUS.

A. FRUCTUS.

a. *Acido-dulces recentes.*

Drupaceæ.

Ceraſus,
Prunus Ceraſus, Syſt. Vegetab. apud Murray, pag. 463,
Cherry.

Prunus,
Prunus domeſtica M. 463,
Plum.

Malum Armeniacum,
Prunus Armeniaca, M. 463,
Apricot.

Malum Perſicum,
Amygdalus Perſica M. 462,
Peach and Nectarine.

Fructus.

Pomaceæ.

Malum hortenſe,
Pyrus Malus, M. 466,
Apple.

Pyrus hortenſis,
Pyrus communis, M. 466,
Pear.

Aurantium,
Citrus Aurantium, M. 697,
Seville orange,
China orange.

Limonium,
Citrus Medica, M. 697,
Lemon.

Senticoſæ.

Fructus.
Senticosæ.
Fraga,
Fragaria vesca M. 476,
Strawberry.
Rubus idæus,
Rubus idæus M. 475,
Raspberry.

Ribesia.
Ribes rubrum,
Ribes rubrum M. 242,
Red currant.

Ribes nigrum,
Ribes nigrum M. 243,
Black currant.

Grossularia,
Ribes Grossularia M. 243,
Gooseberry.

Uvæ vitis,
Vitis vinifera M. 244,
Grapes.

b. *Acido-dulces siccatæ.*
Uvæ passæ majores,
Vitis vinifera M. 244,
Raisins.

Uvæ passæ minores,
Vitis vinifera apyrena Linn. spec. plant. var. β. p. 293,
Dried currants.

Caricæ,
Ficus Carica M. 921,
Fig.

Dactyli,
Phœnix dactylifera M. 985,
Date.

c. *Cucurbitaceæ.*
Cucumis,
Cucumis sativus M. 869,
Cucumber.

Fructus.
Cucurbitaceæ.
Melo,
Cucumis Melo M. 869,
Melon.

B. HERBÆ OLERACEÆ.
Atriplex,
Atriplex hortensis M. 669,
Orache.

Beta,
Beta vulgaris M. 262,
Beet.

Spinacia,
Spinacia oleracea M. 886,
Spinage.
Valerianella,
Valeriana locusta M. 80,
Lamb Lettuce.

Siliquosæ.
Brassica,
Brassica oleracea M. 601,
Colewort and cabbage.

Nasturtium hortense,
Lepidium sativum M. 586,
Garden cress.

Nasturtium aquaticum,
Sisymbrium Nasturtium M. 594,
Water cress.

Semiflosculosæ.
Cichorium,
Cichorium Intybus M. 722,
Succory.

Endivia,
Cichorium Endivia M. 722,
Endive.

Dens leonis,
Leontodon Taraxacum M. 715,
Dandelion.

Lactuca,

Herbæ Oleraceæ.

Semifloſculoſæ.

Lactuca,
Lactuca ſativa M. 713,
Lettuce.

Umbellatæ.

Celeri,
Apium graveolens M. 292,
Celery.

Petroſelinum,
Apium Petroſelinum M. 292,
Parſley.

Capitatæ.

Cinara,
Cynara Scolymus M. 728,
Artichoke.

Aſparagus,
Aſparagus officinalis M. 332
Aſparagus.

C. RADICES.

Siliquoſæ.

Raphanus,
Raphanus ſativus M. 603,
Radiſh.

Rapum,
Braſſica Rapa M. 601,
Turnip.

Umbellatæ.

Daucus,
Daucus Carota M. 277,
Carrot.

Paſtinaca,
Paſtinaca ſativa M. 290,
Parſnip.

Siſarum,
Sium Siſarum M. 284,
Skirret.

Radices.

Semifloſculoſæ.

Scorzonera,
Scorzonera Hiſpanica M. 711,
Viper's graſs.

Tragopogon,
Tragopogon porrifolium M. 710,
Salſafi.

Alliaceæ.

Allium,
Allium ſativum M. 322,
Garlic.

Porrum,
Allium porrum M. 321,
Leek.

Cepa,
Allium Cepa M. 323,
Onion.

Cepa aſcalonica,
Allium aſcalonicum M. 323,
Shallot.

Scorodopraſum,
Allium Scorodopraſum M. 322,
Roccambole.

Farinoſæ.

Battatas,
Solanum tuberoſum M. 224.
Potatoes.

Salep,
Orchis Morio M. 808,
Salep.

D. SEMINA.

Cerealia.

Hordeum,
Hordeum vulgare M. 125,
Barley.

Avena,

Semina.

Cerealia.

Avena,
Avena ſativa M. 122,
Oat.

Secale,
Secale cereale M. 125,
Rye.

Milium,
Panicum miliaceum M. 106,
Millet.

Triticum,
Triticum hybernum M. 126,
Wheat.

Oryza,
Oryza ſativa M. 345,
Rice.

Maiz,
Zea Mays M. 841,
Maize.

Cerealibus affinia.

Sago,
Cycas circinalis M. 925,
Sago.

Fagopyrum,
Polygonum Fagopyrum M. 379,
Buck wheat.

Caſtanea,
Fagus Caſtanea M. 859,
Cheſnut.

Legumina.

Piſum,
Piſum ſativum M. 660,
Pea.

Faba,
Vicia Faba M. 665,
Bean.

Semina.

Legumina.

Phaſeolus,
Phaſeolus vulgaris M. 656,
Kidney bean.

Nuces oleoſæ.

Amygdalus,
Amygdalus communis M. 462,
Variat dulcis,
amara,
Sweet almonds,
Bitter almonds.

Avellana,
Corylus Avellana M. 859,
Filbert.

Cacao,
Theobroma Cacao M. 696,
Chocolate.

Juglans,
Juglans regia M. 858,
Walnut.

Piſtachio,
Piſtacia vera M. 884,
Piſtachio nut.

Sepiariæ.

Olivæ,
Olea Europœa M. 57,
Olives.

E. FUNGI.

Agaricus campeſtris M. 975,
Common eſculent muſhroom.

Phallus eſculentus M. 978,
Morell.

Lycoperdon tuber M. 981,
Truffle.

SECTIO

II. Ex ANIMALIBUS*.

A. QUADRUPEDIA.

a. *Lac :*

Fœminæ,
Asinæ,
Equæ,
Vaccæ,
Capræ,
Ovis.

b. *Carnes.*

Pecora.

Bos,
Bos Taurus Linn. Syst. Nat. 98,
The ox.

Ovis,
Ovis Aries L. 97,
The sheep.

Caper,
Capra Hircus L. 94,
The goat.

Cervus,
Cervus Elaphus L. 92,
The hart, stag, or red deer.

Cervus,
Cervus Dama L. 93,
Buck or fallow deer.

Cervus,
Cervus Capreolus L. 94,
Roebuck.

Glires.

Lepus,
Lepus timidus L. 77,
The hare.

Cuniculus,
Lepus Cuniculus L. 77,
The rabbit.

Belluæ.

Sus,
Sus Scrofa L. 102,
The hog.

B. AVES.

Gallinæ.

Gallus,
Phasianus Gallus L. 270,
Dunghill fowl.

Phasianus,
Phasianus colchicus L. 271,
Pheasant.

Gallo Pavo,
Meleagris Gallo pavo L. 268,
Turkey.

Pavo,
Pavo cristatus L. 267,
Peacock.

Meleagris,
Numida Meleagris L. 273,
Guiney hen.

Perdix,
Tetrao Perdix L. 276,
Partridge.

Coturnix,
Tetrao Coturnix L. 278,
Quail.

Lagopus,
Tetrao Lagopus L. 274,
Ptarmigan.

Tetrao rufescens,
Bonasa Scotica Briss. Ornith. p. 199.
Scotis, Moorfowl.
Anglis, Redgame or Grouse.

Tetrix,
Tetrao Tetrix, L. 274,
Black cock, or black game.

* Animalium nomina systematica ad Linnæi Systema Naturæ anno 1766 editum ubique referuntur.

Aves.
Gallinæ.
Urogallus,
Tetrao Urogallus L. 273,
Cock of the mountain.

Anſeres.
Anas domeſtica,
Anas Boſchas L. 205,
Common duck.

Querquedula,
Anas Crecca L. 204,
Teal.

Anſer domeſticus et ferus,
Anas Anſer L. 197,
Tame and wild gooſe.

Anſer Baſſanus,
Pelicanus Baſſanus L. 217,
Solan gooſe.

Alca,
Alca Torda L. 210,
Razorbill or marrot.

Larus,
Larus tridactylus L. 224,
Kittiwake.

Grallæ.
Scolopax,
Scolopax ruſticola L. 243,
Woodcock.

Gallinago minor,
Scolopax Gallinago L. 244,
Snipe.

Arquata,
Scolopax Arquata L. 242,
Curlew.

Tringa,
Tringa Squatarola L. 252,
Grey plover.

Aves.
Grallæ.
Charadrius,
Charadrius pluvialis L. 254,
Green plover.

Rallus,
Rallus Crex L. 261,
Land rail.

Paſſeres.
Columba,
Columba Oenas L. 279,
Pigeon.

Alauda,
Alauda arvenſis L. 287,
Lark.

VOLUCRUM OVA.

C. AMPHIBIA.
Amphibia reptilia.
Teſtudo,
Teſtudo Mydas L. 350,
Tortoiſe.

Rana,
Rana eſculenta L. 357,
Frog.

Amphibia ſerpentia.
Vipera,
Coluber berus L. 377,
Viper or adder.

Amphibia nantia.
Batis,
Raia Batis L. 395,
Skate.

Clavata,
Raia clavata L. 397,
The Thornback.

D. PISCES.
Anguilla,
Muræna Anguilla L. 426,
Eel.

Anarhichas

Pisces.

Anarhichas,
Anarhichas Lupus L. 430,
Wolf-fish or cat-fish.

Gadus,
Gadus Morhua L. 436,
Cod.

Gadus Æglefinus L. 435,
Haddoc.

Gadus Merlangus L. 438,
Whiting.

Faber,
Zeus Faber L. 454,
The doree.

Pleuronectes Rhombus L. 458,
Turbot.

Pleuronectes Solea L. 457,
The sole.

Pleuronectes Flesus L. 457,
Grey flounder.

Perca,
Perca fluviatilis L. 481,
Perch.

Scomber,
Scomber Scomber L. 492,
Mackrel.

Salmo,
Salmo Salar L. 509,
Salmon.

Esox Lucius L. 516,
The pike.

Clupea Harengus L. 522,
Herring.

Clupea Encrasicolus L. 523,
Anchovy.

Pisces

Cyprinus Carpio L. 525,
Carp.

Cyprinus Trinca L. 526,
Tench.

E. INSECTA.

Cancer,
Cancer Pagurus L. 1044,
Common crab.

Cancer Gammarus L. 1050,
The lobster.

Cancer Astacus L. 1051,
The Crayfish.

Cancer Squilla L. 1051,
The prawn.

F. VERMES.

Pectunculus vulgaris,
Cardium edule L. 1124,
Cockle.

Ostrea,
Ostrea edulis L. 1148,
Common oyster.

Mytilus,
Mytilus edulis L. 1157,
Common muscle.

SECTIO II. POTUS.

Aqua et aquosa.
Potus fermentati.
Cerevisia.
Vinum.

SECTIO III. CONDIMENTA & CONDITA.

Aromata et acria.
Saccharo, sale, vel aceto Condita.

PARS II. MEDICAMENTA.

I. ADSTRINGENTIA.

A. EX FOSSILIBUS.

Bolus,
Argilla,
Bole.

Creta,
Calx Creta,
Chalk.

Alumen,
Alumen commune ſchiſti
Alum.

Metallica.

Ex Ferro:
Hæmatites,
Rubigo,
Vitriolum viride.

Ex Cupro:
Ærugo,
Vitriolum cæruleum.

Ex Plumbo:
Ceruſſa,
Saccharum ſaturni,
Lithargyrus,
Minium.

Ex Zinco:
Calaminaris,
Tutia,
Vitriolum album.

B. EX VEGETABILIBUS.

a. *Senticoſæ.*

Agrimonia,
Agrimonia Eupatoria M. 447,
Agrimony.

Alchemilla,
Alchemilla vulgaris M. 166,
Ladies mantle.

Ex Vegetabilibus.

Senticoſæ.

Argentina,
Potentilla Anſerina M. 477,
Silver weed.

Caryophyllata,
Geum urbanum M. 480,
Avens.

Fragaria,
Fragaria veſca M. 476,
Strawberry.

Roſa rubra,
Roſa Gallica M. 474,
The red roſe.

Quinquefolium,
Pentaphyllum,
Potentilla reptans M. 479,
Cinquefoil.

Tormentilla,
Tormentilla erecta M. 479,
Tormentil.

b. *Stellatæ.*

Aparine,
Galium Aparine M. 151,
Gooſe graſs.

Galium,
Galium verum M. 150,
Ladies bedſtraw.

Rubia,
Rubia tinctorum M. 152,
Madder.

c. *Vaginales.*

Acetoſa,
Rumex Acetoſa M. 348,
Sorrel.

Ex

Ex Vegetabilibus.

Vaginales.

Hydrolapathum,
Rumex aquaticus M. 347,
Great water-dock.
Oxylapathum,
Rumex acutus M. 346,
Sharp-pointed dock.
Biſtorta,
Polygonum Biſtorta M. 376,
Greater biſtort.
Rhabarbarum monachorum,
Rumex alpinus M. 347,
Monks rhubarb.
Rhaponticum,
Rheum Rhaponticum M. 385,
Rhapontic.

d. *Cryptogamiæ.*

Filix florida,
Oſmunda regalis M. 927,
Flowering fern.
Lingua cervina,
Aſplenium Scolopendrium M. 932,
Harts-tongue.
Trichomanes,
Aſplenium Trichomanes M. 941,
Maidenhair.
Filix,
Polypodium Filix mas M. 937,
Male fern.
Equiſetum,
Equiſetum hyemale M. 925,
Horſe tail.
Muſcus pyxidatus,
Lichen pyxidatus M. 963,
Cup-moſs.

Ex Vegetabilibus.

e. *Cortices.*

Malicorium,
Punica Granatum M. 462,
Pomegranate kind.

Fraxini,
Fraxinus excelſior M. 918,
Aſh bark.

Querci,
Quercus Robur M. 858,
Oak bark.

Lignum Campechenſe,
Hæmatoxylum Campechianum M. 398,
Logwood.

Gallæ,
Quercus Cerris M. 858,
Galls.

f. *Fructus acerbi.*

Cydonia,
Pyrus Cydonia M. 467,
Quinces.
Meſpila,
Meſpilus Germanica M. 466,
Medlars.
Mora,
Morus nigra M. 851,
Mulberries.
Pruna Silveſtria,
Prunus ſpinoſa M. 463,
Sloes.
Sorba,
Sorbus domeſtica M. 465,
Wild ſervice berries.

g. *Succi inſpiſſati.*

Acacia,
Mimoſa Nilotica M. 917,
Acacia.

Ex

Ex Vegetabilibus.

Succi inſpiſſati.

Terra Japonica,
Mimoſa Catechu M. 916,
Japan earth.

Sanguis Draconis,
Pterocarpus Draco M. 641,
Dragon's blood.

Kino,
Gummi rubrum aſtringens,
Kino.

h. *Adſtringentia varia ad certa capita non referenda.*

Anchuſa,
Anchuſa tinctoria M. 186,
Alkanet.

Balauſtia,
Punica Granatum M. 462,
Balauſtines.

Hypericum,
Hypericum perforatum M. 701,
St. John's wort.

Salicaria,
Lythrum Salicaria M. 446,
Looſe ſtrife.

Millefolium,
Achillea Millefolium M. 778,
Milfoil or yarrow.

Myrtus,
Myrtus communis M. 461,
Myrtle.

Plantago,
Plantago major M. 155,
Plantain.

Polygonatum,
Convallaria Polygonatum M. 334,
Solomon's ſeal.

Ex Vegetabilibus.

Adſtringentia varia.

Viſcus quernus,
Viſcum album M. 883,
Miſletoe.

Uva Urſi,
Arbutus Uva Urſi M. 408,
Bear's berry.

II. TONICA.

Gentiana,
Gentiana lutea M. 267,
Gentian.

Curſuta,
Gentiana purpurea M. 267,
Curſuta.

Centaureum minus,
Gentiana Centaureum M. 268,
Leſſer centaury.

Quaſſia,
Quaſſia amara M. 401,
Quaſſy.

Simarouba,
Quaſſia Simarouba M. 401,
Simarouba.

Trifolium paluſtre,
Menyanthes trifoliata M. 194,
Marſh trefoil or buck bean.

Faba St. Ignatii,
Ignatia amara M. 227,
Jeſuit's bean.

Fumaria,
Fumaria officinalis M. 637,
Common fumitory.

Chamamælum,
Anthemis nobilis M. 776,
Chamomile.

Tonica.

Tonica.

Tanacetum,
Tanacetum vulgare M. 742,
Tanſey.
Abſynthium,
Artemiſia Abſynthium M. 744,
Wormwood.
Abrotanum,
Artemiſia Abrotanum M. 743,
Southernwood.
Lupulus,
Humulus Lupulus M. 886,
Hops.
Scordium,
Teucrium Scordium M. 527,
Water germander.
Serpentaria Virginiana,
AriſtolochiaSerpentariaM. 824,
Virginian ſnake-root.
Arnica,
Arnica montana M. 768,
Leopard's bane.
Cortex Peruvianus,
Cinchona officinalis M. 213,
Peruvian bark.

III. EMOLLIENTIA.

Aqua.
Aqua cum farinoſis vel mucilaginoſis infuſa vel decocta.

1. Ex VEGETABILIBUS.

a. *Columniferæ.*

Althæa,
Althæa officinalis M. 624,
Marſh mallow.
Malva,
Malva Silveſtris M. 625,
Mallow.

Ex Vegetabilibus.

b. *Farinoſa vel mucilaginoſa.*

Cannabis ſemina,
Cannabis ſativa M. 886,
Hemp ſeed.

Cydoniorum ſemina,
Pyrus Cydonia M. 467,
Quince ſeed.

Fœnugræci ſemina,
Trigonella Monſpelienſis M. 692,
Fenugreek ſeed.
Lini ſemina,
Linum uſitatiſſimum M. 302,
Linſeed.
Pſyllii ſemina,
Plantago Pſyllium M. 156,
Fleawort ſeed.

c. *Oleraceæ.*

Atriplex,
Atriplex hortenſis M. 909,
Orache.
Beta,
Beta vulgaris M. 262,
White and red beet.
Bonus Henricus,
Chenopodium Bonus Henricus M. 261,
Engliſh mercury.
Spinacia,
Spinacia oleracea M. 886,
Spinage.

d. *Emollientia varia.*

Alſine,
Alſine media M. 298,
Chickweed.
Branca urſina,
Acanthus mollis M. 580,
Bears breech.

Ex

Ex Vegetabilibus.
Emollientia varia.
Melilotus,
Trifolium Melilotus M. 687,
Melilot.
Parietaria,
Parietaria officinalis M. 908,
Pellitory of the wall.
Saponaria,
Saponaria officinalis M. 416,
Soapwort.
Verbascum,
Verbascum Thapsus M. 219,
Mullein.
Radix liliorum alborum,
Lilium candidum M. 324,
White lily.
Cepæ coctæ,
Allium Cepa M. 323,
Onion.
e. *Oleosa.*
Olea expressa blanda.
2. Ex ANIMALIBUS.
Lac,
Butyrum,
Adeps,
Axungia.
Spermaceti,
Physeter macrocephalus L. 107,
Spermaceti.
IV. ERODENTIA SIVE CORROSIVA.
Acidum concentratum,
Vitriolicum,
Nitrosum.
Causticum commune acerrimum,
Lixivium causticum inspissatum Ph. Ed.
Strong caustic.
Erodentia sive Corrosiva.
Causticum commune mitius,
Lixivium Causticum cum calce viva Ph. Ed.
Common caustic.
Causticum commune fortius,
Calx cum Kali puro Ph. Lond.
Strong London caustic.
Causticum Lunare,
Acidum nitrosum argento junctum,
Lunar caustic.
Vitriolum cæruleum,
Acidum vitriolicum cupro junctum,
Blue vitriol.
Ærugo,
Acidum vegetabile cupro junctum,
Verdigrise.
Butyrum antimonii,
Acidum muriaticum antimonio junctum,
Butter of antimony.
Hydrargyrus acidis variis junctus,
Preparations of quicksilver.
Arsenicum album,
Arsenicum nudum L. S. N. 107,
Arsenic.
V. STIMULANTIA.
A. VERTICILLATÆ.
Betonica,
Betonica officinalis M. 535,
Betony.
Lavendula,
Lavendula Spica M. 530,
Lavender.
Melissa,
Melissa officinalis M. 542,
Baum.

Stimulantia.
Verticillatæ.
Majorana,
Origanum Majorana M. 541
Sweet marjoram.

Origanum,
Origanum vulgare M. 541,
Wild marjoram.

Marum,
Origanum Syriacum M. 541
Syrian herb maſtich.

Roſmarinus,
Roſmarinus officinalis M. 68,
Roſemary.

Hyſſopus,
Hyſſopus officinalis M. 529,
Hyſſop.

Hedera terreſtris,
Glechoma hederacea M. 534,
Ground ivy.

Mentha,
Mentha viridis M. 532,
Mentha ſpicata Hudſoni Flora Anglica,
Spearmint.
Mentha piperita,
Mentha piperita M. 532,
Peppermint.
Pulegium,
Mentha Pulegium M. 533,
Pennyroyal.
Satureia,
Satureia hortenſis M. 528,
Savoury.
Thymus,
Thymus vulgaris M. 542,
Thyme.
Serpyllum,
Thymus Serpyllum M. 541,
Mother of thyme.

Stimulantia.
Verticillatæ.
Salvia,
Salvia officinalis M. 68,
Sage.

B. UMBELLATÆ.
Anethum,
Anethum graveolens M. 290,
Dill.
Angelica,
Angelica Archangelica M. 284,
Garden angelica.
Aniſum,
Pimpinella Aniſum M. 291,
Aniſe.
Carum,
Carum Carvi M. 291,
Caraway.
Coriandrum,
Coriandrum ſativum M 287,
Coriander.
Cuminum,
Cuminum Cyminum M. 285,
Cummin.
Fœniculum,
Anethum Fœniculum M. 291,
Sweet fennel.
Pimpinella,
Pimpinella Saxifraga M. 291,
Burnet ſaxifrage.

C. SILIQUOSÆ.
Cochlearia,
Cochlearia officinalis M. 588,
Scurvy-graſs.
Eryſimum,
Eryſimum officinale M. 596,
Hedge muſtard.

Stimulantia.

Stimulantia.
Siliquoſæ.
Naſturtium,
Siſymbrium Naſturtium M. 594,
Water creſſes.
Raphanus ruſticanus,
Cochlearia Armoracia M. 588,
Horſe radiſh.
Sinapi,
Sinapis nigra M. 602,
Muſtard.

D. ALLIACEÆ.

Allium,
Allium ſativum M. 322,
Garlic.
Cepa,
Allium Cepa M. 323,
Onion.
Porrum,
Allium Porrum M. 321,
Leek.

E. CONIFERÆ.

Abies,
Pinus abies M. 861,
Scotch fir.
Pinus,
Pinus Silveſtris M. 860,
Pine.
Juniperus,
Juniperus communis M. 894,
Juniper.

F. BALSAMICA.

Terebinthina Veneta,
Pinus Larix M. 860,
Venice turpentine.
Terebinthina communis,
Pinus Silveſtris M. 860,
Common turpentine.

Stimulantia.
Balſamica.
Balſamum Canadenſe,
Pinus Balſamica M. 860,
Canada balſam.
Balſamum Copaibæ,
Copaifera officinalis M. 409,
Balſam of Copaiba or Capivi.
Balſamum Peruvianum,
Myroxylon Peruiferum M. 395,
Peruvian balſam or balſam of Peru.
Balſamum Tolutanum,
Toluifera balſamum M. 398,
Balſam of Tolu.

G. RESINOSA.

Guaiacum,
Guaiacum officinale M. 396,
Gum guaiacum.

Myrrha,
Myrrha,
Myrrh.

Ladanum,
Ciſtus Creticus M. 497,
Labdanum.
Styrax calamita,
Styrax officinale M. 409,
Storax.

Styrax liquida,
Liquidambar Styraciflua M. 860,
Liquid ſtorax.

Benzoinum,
Croton Benzoe M. 863,
Benjamin.

H. AROMATICA.

Cinnamomum,
Laurus Cinnamomum M. 383,
Cinnamon.

Stimulantiæ.

Stimulantia.
Aromatica.
Caſſia lignea,
Laurus Caſſia M. 383,
Caſſia bark.
Nux Moſchata,
Myriſtica Moſchata M. 493,
Nutmeg.
Macis,
Myriſtica Moſchata M. 493,
Mace.
Caryophillus,
Caryophillus aromaticus M 496,
Cloves.

Pimento,
Myrtus Pimenta M. 462,
Jamaica pepper or All-ſpice.

Canella alba,
Canella alba M. 443,
Wild cinnamon.

Cortex Winteranus,
Wintera aromatica M. 507,
Winter's bark.

Caſcarilla,
Croton Caſcarilla M. 863,
Caſcarilla.

Piper,
Piper nigrum M. 74,
Black pepper.

Capſicum,
Capſicum annuum M. 226,
Guiney pepper.

Zingiber,
Amomum Gingiber M. 50,
Ginger.

Cubebæ,
Piper Cubeba ſive Caudatum M. 74,
Cubebs.

Stimulantia.
Aromatica.
Cardamomum minus,
Amomum Cardamomum M. 50,
Cardamom.
Zedoaria,
Kaempferia rotunda M. 51,
Zedoary.
Serpentaria Virginiana,
Ariſtolochia Serpentaria M. 824,
Virginian ſnake-root.
Ginſeng,
Panax quinquefolium M. 920,
Ginſeng.
Acorus verus,
Acorus Calamus M. 339,
Sweet-ſcented flag.

I. ACRIA.
Arum,
Arum maculatum M. 828,
Cuckow pint.
Perſicaria urens,
Polygonum Hydropiper M. 377,
Water-pepper or arſmart.
Pyrethrum,
Anthemis Pyrethrum M. 776,
Pellitory of Spain.
Staphiſagria,
Delphinium Staphiſagria M. 503,
Staves acre.

SEDANTIA.

VI. NARCOTICA.

a. *Rhœades.*

Papaver,
Papaver ſomniferum M. 490
White poppy.

Sedantia.

Sedantia.

Norcotica.

b. *Umbellatæ.*

Cicuta,
Conium maculatum M. 278,
Hemlock.
Cicuta aquatica,
Cicuta viroſa M. 286,
Water hemlock.

c. *Solanaceæ.*

Belladonna.
Atropa Belladonna M. 221,
Deadly night-ſhade.

Hyoſcyamus,
Hyoſcyamus niger M. 220,
Henbane.

Nicotiana,
Nicotiana Tabacum M. 221,
Tobacco.

Solanum,
Solanum nigrum M. 224,
Night-ſhade.
Stramonium,
Datura Stramonium M. 220,
Thorn apple.

d. *Variæ.*

Lactuca viroſa,
Lactuca viroſa M. 713,
Strong-ſcented lettuce.
Lauro Ceraſus,
Prunus Lauro-Ceraſus M. 462,
Cherry bay.
Laurus,
Laurus nobilis M. 383,
Bay.
Camphora,
Laurus Camphora M. 383,
Camphire.

Sedantia.

Narcotica.

Thea,
Thea Bohea M. 495,
Thea viridis M. 496,
Bohea and green tea.
Crocus,
Crocus ſativus M. 83,
Saffron.
Nymphæa,
Nymphæa alba M. 491,
Nymphæa lutea M. 491,
Water lily.

e. Vinum.

Alcohol.

VII. REFRIGERANTIA.

Acida quæcunque diluta,
Sales neutri ex acido quovis præter muriatico cum alkali quovis juncto,
Sal terreſtris ex acido cum terra alkalina juncto,
Sal metallicus ex acido cum plumbo juncto,
Aquæ minerales ſalinæ,
Borax,
Alumen,
Plantarum Fructus Herbæ et Radices Acidi,
Lactis ſerum,
Lac ebutyratum.

VIII. ANTISPASMODICA.

1. EX FOSSILIBUS.

Ambra,
Ambra Ambroſiaca L.S.N. 107,
Ambergreaſe.
Succinum,
Succinum electricum L. 108
Amber.

Anti-

Antiſpaſmodica.

Ex Foſſilibus.

Petroleum,
Bitumen Petroleum L. 109,
Rock oil.

2. EX VEGETABILIBUS.

Herbæ fœtidæ.

Artemiſia,
Artemiſia vulgaris M. 744,
Mugwort.

Atriplex fœtida,
Chenopodium Vulvaria M. 262,
Stinking orache.

Cuminum.

Matricaria,
Matricaria Parthenium M. 774,
Feverfew.

Pulegium.

Ruta,
Ruta graveolens M. 397,
Rue.

Sabina,
Juniperus Sabina M. 894,
Savin.

Gummi fœtidæ.

Aſafœtida,
Ferula Aſafœtida M. 281,
Aſafœtida.

Ammoniacum,

Gum ammoniac.

Galbanum,
Bubon Galbanum M. 285,
Galbanum.

Antiſpaſmodica.

Gummi fœtidæ.

Opopanax,
Paſtinaca Opopanax M. 290,
Opopanax.

Sagapenum,

Sagapenum.

Tacamahaca,
Populus balſamifera L. M. M. 600,
Tacamahaca.

Camphora.

Radices graveolentes.

Pœonia,
Pœonia officinalis M. 502,
Pœony.

Valeriana ſilveſtris,
Valeriana officinalis M. 80,
Wild valerian.

Fuligo ligni.
Olea eſſentialia.
Æthera.
Olea empyreumatica.
Alcohol.

3. EX ANIMALIBUS.

Moſchus,
Moſchus moſchiferus L. 91,
Muſk.

Caſtoreum,
Caſtor Fiber L. 78,
Caſtor.

Sales alkalini volatiles.
Ammonia Ph. Lond.
Volatile alkali.

IX. DILUENTIA.

Aqua,
Aquoſa blanda.

X.

X. ATTENUANTIA.

Aqua,
Alkalina,
Sales neutri,
Sapones,
Dulcia,
Saccharum,
Mel,
Glycyrrhiza,
Fructus ficcatæ.

XI. INSPISSANTIA.

Acida,
Alcohol,
Demulcentia farinosa et mucilaginosa.

XII. DEMULCENTIA.

a. *Asperifoliæ.*

Consolida major,
Symphytum officinale M. 187,
Comfrey.

Cynoglossum,
Cynoglossum officinale M. 186,
Hound's tongue.

b. *Mucilaginosa.*

Gummi Arabicum,
Mimosa nilotica M. 917,
Gum Arabic.

Gummi cerasi,
Prunus Cerasus M. 463,
Cherry-tree gum.

Gummi Tragacantha,
Astragalus Tragacantha M. 685,
Gum Tragacanth.

Amylum,
Ex tritico vel aliis farinosis,
Starch.

Demulcentia.

Mucilaginosa.

Ichthyocolla,
Acipenser Sturio L. 403,
Isinglass.

c. Gelatinæ ex rebus animalibus.

d. Oleosa blanda.

XIII. ANTACIDA.

Lapides calcariæ,
Creta,
Magnesia alba,
Testacea,
Corallium,
Corallina,
Cornu cervi ustum,
Sales alkalini fixi,
Sales alkalini volatiles,
Calx viva.

XIV. ANTALKALINA.

Acida quæcunque supra inter Refrigerantia enumerata.

XV. ANTISEPTICA.

Sales acidi omnes supra inter Refrigerantia recensiti,
Sales alkalini tum fixi tum volatiles,
Sales neutri ex acido quovis cum Sale alkalino vel cum terreis juncto,
Plantarum partes acidæ,
Olera acescentia,
Saccharum,
Mel,
Plantæ Siliquosæ vulgo antiscorbutica dictæ,
Plantæ alliaceæ,
Astringentia,
Amara,

Anti-

Antiſeptica.

Aromatica,
Olea eſſentialia,
Camphora,
Gummi Reſinæ,
Crocus,
Radix Contrayervæ,
Radix valerianæ Silveſtris,
Opium,
Decoctum capitum papaveris albi,
Vinum et liquores fermentati,
Alcohol.

XVI. ERRHINA.

Mitiora.

Beta,
Betonica,
Majorana.

Acriora.

Aſarum,
Aſarum Europæum M. 441,
Aſarabacca.

Euphorbium,
Euphorbium officinale M. 449,
Euphorbium.

Helleborus albus,
Veratrum album M. 902,
White hellebore.

Iris noſtras.

Nicotiana.

Ptarmica,
Achillea Ptarmica M. 777,
Sneezewort.

Pyrethrum,
Turbith minerale.
Hydrargyrus acido vitriolico junctus.

XVII. SIALAGOGA.

Externa maſticatoria.

Angelica.

Caryophylli.

Imperatoria,
Imperatoria Oſtruthium M. 289,
Maſterwort.

Nicotiana.
Piper.
Pyrethrum.

Interna.

Hydrargyrus.

XVIII. EXPECTORANTIA.

Hedera terreſtris.
Hyſſopus.

Marrubium,
Marrubium vulgare M. 537,
White hore-hound.

Pulegium.

Enula campana,
Inula Helenium M. 766,
Elecampane.

Iris Florentina,
Iris Florentina M. 88,
Florentine Orrice.

Nicotiana

Scilla,
Scilla maritima M. 328,
Squill.

Tuſſilago,
Tuſſilago Farfara M. 755,
Colt's foot.

Expecto-

Expectorantia.

Petasites,
Tussilago Petasites M. 756,
Butterbur.

Benzoinum.

Styrax calamita.
Balsamum Canadense.
Balsamum Tolutanum.

XIX. EMETICA.

1. Ex FOSSILIBUS.

Cuprum,
Hydrargyrus,
Antimonium,
Zincum.

2. Ex VEGETABILIBUS.

Asarum.

Erigerum,
Senecio vulgaris M. 756,
Groundsel.

Ipecacoanha,
Psychotria emetica M. 214,
Ipecacuanha.

Nicotiana.
Scilla.
Sinapi.
Raphanus rusticanus.
Sales alkalini volatiles.
Amara.

XX. CATHARTICA.

1. *Mitiora.*

Acescentia.

Fructus acidio-dulces
recentes.
siccatæ.

Cathartica.

Mitiora.

Acescentia.

Cassia Fistularis,
Cassia Fistula M. 393,
Cassia of the cane.

Tamarindus,
Tamarindus Indica M. 81,
Tamarind.

Dulcia.

Saccharum.
Mel.

Manna,
Fraxinus Ornus M. 918,
Manna.

Radices dulces.
Olera blanda.

Rosa Damascena,
Rosa centifolia M. 474,
Damask rose.

Viola,
Viola odorata M. 803,
Sweet scented violet.

Polypodium,
Polypodium vulgare M. 935,
Polypody.

Serum lactis.
Lac ebutyratum.
Olea expressa blanda ex
Vegetabilibus.
ex animalibus.
Sapo albus Hispanus.
Sinapi nigrum.
Sulphur.

Salina.

Tartarus.

Cathartica.

Cathartica.

Mitiora.

Salina.

Alkalina fixa.
Magnesia alba.
Sales neutri.
Aquæ minerales salinæ.
Amara.
Bilis animalium.
Balsamica.

2. *Acriora.*

Aloe,
Aloe perfoliata M. 337,
Socotrine and hepatic aloes.

Rhabarbarum,
Rheum palmatum M. 385,
Rhubarb.

Seneka,
Polygala Senega M. 640,
Rattle-snake root.

Genista,
Spartium Scoparium M. 644,
Broom.

Sambucus,
Sambucus nigra M. 295,
Common elder.

Ebulus,
Sambucus Ebulus M. 295,
Dwarf elder.

Ricini Oleum,
Ricinus communis M. 865,
Castor oil.

Senna,
Cassia Senna M. 393,
Senna.

Cathartica.

Acriora.

Helleborus niger,
Helleborus niger M. 519,
Black hellebore.
Jalapium Ph. Lond.
Jalapa Ph. Edin.
Convolvulus Jalapa M. 201,
Jalap.

Scammonium,
Convolvulus Scammonium M. 200,
Scammony.

Rhamni baccæ,
Rhamnus Catharticus M. 232,
Buckthorn berries.

Gambogia,
Cambogia Gutta M. 490,
Gamboge.

Nicotiana.
Helleborus albus.

Colocynthis,
Cucumis Colocynthis M. 869,
Bitter apple.

Elaterium,
Momordica Elaterium M. 868,
Elaterium.

Metallica.

Ex auro,
Ex Argento,
Ex Hydrargyro,
Ex Antimonio.
Emetica.

XXI. DIURETICA.

a. *Umbellatæ.*

Petroselinum,

Diuretica.

Umbellatæ.

Daucus,
Fœniculum,
Pimpinella,
Eryngium.

b. *Stellatæ.*

Aparine,
Rubia.

c. *Varia.*

Alkekengi,
Physalis Alkekengi M. 222,
Winter cherry.

Bardana,
Arctium Lappa M. 723,
Burdock.

Dulcamara,
Solanum Dulcamara M. 223,
Bittersweet.

Gramen,
Triticum repens M. 127,
Quickgrass.

Lithospermum,
Lithospermum officinale M. 185,
Gromwell.

Ononis,
Ononis spinosa M. 651,
Restharrow.

Arum.
Asarum.
Asparagus.

Digitalis,
Digitalis purpurea M. 562,
Foxglove.

Enula campana.

Diuretica.

Varia.

Genista.
Nicotiana.
Persicaria.
Ranunculus.
Ruta.
Sabina.
Senega.
Scilla.

Amara.

Balsamica,
Siliquosæ,
Alliaceæ.

Ex Animalibus.

Cantharides,
Millepedæ,
Sales acidi,
Sales alkalini fixi,
Sales neutri,
Sapo albus Hispanus.

XXII. DIAPHORETICA.

Calendula,
Calendula officinalis M. 791,
Marigold.

Crocus.
Dulcamara.
Opium.
Camphora.
Contrayerva.
Serpentaria.
Salvia.
Scordium.
Guaiacum.
Sassafras.
Senega.

Diaphoretica.

Diaphoretica.

Moſchus.
Acida vegetabilia.
Alkali volatile.
Sales neutri.
Olea eſſentialia.
Olea empyreumatica.
Vinum.
Alcohol.
Antimonium.
Diluentia.

Diaphoretica.

Hydrargyrus.

XXIII. MENAGOGA.

Aloe.
Gummi fœtida.
Plantæ fœtidæ.
Crocus.
Caſtoreum.
Ferrum.
Hydrargyrus.

A

TREATISE

OF THE

MATERIA MEDICA.

HAVING thus finiſhed all that ſeemed neceſſary by way of introduction, we now proceed to enter more directly upon our ſubject, and ſhall divide our work into two parts; the one treating of aliments, the other of medicines: The former being, as we have ſaid, ſuch ſubſtances as are ſuited to ſupply the matter, whether ſolid or fluid, of the human body; and the latter being ſuch as have no ſuch property, but are capable of variouſly changing the ſtate of the body, and particularly of changing the ſtate of diſeaſe into that of health. It is true indeed, that this laſt mentioned purpoſe may often be obtained by a certain management of alimentary matters, which thereby becomes medicines and ſubjects of the materia medica; and we ſhall have frequent occaſion to view them in this light. But ſtill it will be alſo proper to conſider them ſeparately; and we ſhall begin firſt with treating of the aliments.

PART

PART I.

OF ALIMENTS.

CHAPTER I.

OF ALIMENTS IN GENERAL.

WE have already ſaid, that aliments are thoſe ſubſtances which taken into the body are fitted to afford and ſupply the fluid and ſolid matter of it. On this ſubject, it might be ſuppoſed at firſt ſight that theſe aliments ſhould be diſtinguiſhed according as they are fitted to ſupply the matter of the ſolid or of the fluid parts; but upon further conſideration, the marking of ſuch a diſtinction will not be found neceſſary. It is ſufficiently evident with reſpect to the alimentary matters taken into the body, that if they be in a ſolid ſtate, they muſt, in order to their diſtribution and proper application, be by the powers of the animal œconomy converted into a fluid form: and as it is alſo obvious that this does conſtantly take place; ſo it will readily appear that the matter fitted to form the ſolids makes always a conſiderable portion of the fluids. It is the production of theſe laſt, therefore, that we are firſt to account for; and I expect that in doing this we ſhall be able to account

count also for the production of the matter suited to form the solids.

When we consider the whole of the fluids of the body, they appear to be of many different kinds; but we can particularly distinguish those that are pretty constantly in the course of the circulation, which we call the *common mass*, from those that are found in other vessels than those concerned in the circulation. These, however, being all of them, as we presume, drawn from the common mass, and therefore originally of the same matter, only somewhat changed by the secretory organs through which they pass; so we shall omit considering them any further here, and shall inquire at present only into the nature and production of that matter which forms the circulating or common mass.

To this purpose it is to be observed, that besides elementary water, which always makes the largest portion of the human fluids, the next considerable part of the common mass is what we have named the gluten or coagulable lymph. This I consider as the chief part of the mass, because I suppose it to be that part of it which gives the matter of the solids, or the permanent constituent parts of the body, and which, from the beginning to the end of life, are constantly receiving a further accretion and increase. That the gluten is that part of the fluids which affords the matter of the solids, is sufficiently probable from this, that in all its qualities it very nearly resembles the solid matter of the body, while in any other part of the fluids there is no such resemblance. Therefore this gluten we hold to be the chief part of the fluids; and considering how much of it is diffused among the other fluids, and how much of it is dissolved in the serum or serosity, it is certainly, next to the water, the largest portion of the common mass. It may consequently be viewed as that into which the aliments, so far as they are nutritious, are converted, and therefore may be considered as the proper *animal fluid*. Under this title we shall hereafter speak of it; or to avoid all ambiguity, I shall frequently call it the *animal mixt*.

In order to account for the other matters that appear to be in the common mass, we must observe, that when this animal mixt is fully formed, it does not long remain stationary in that condition, but seems to be constantly, although perhaps slowly, proceeding to a putrid or putrescent state; as we know that if fresh aliment be not constantly supplied, the whole of the fluids will in no long time become very putrid. In this progress, as in other processes of putrefaction, we find the mild and perfectly neutral substances changed into a saline state of the ammoniacal kind; and this saline matter being washed off from the entire gluten by the water which constantly accompanies it, seems to form the *serosity* of the common mass. It is this again which nature, in order to prevent an undue accumulation of it, has provided for being carried out of the body by the several excretions, and that in the proportion necessary to preserve the health of the system.

We thus find that the portion of the common mass, which is termed the serosity, and which seems different from the gluten or animal mixt, is however formed from this, and does not therefore lead to suppose any other supply of alimentary matter than what is necessary to that.

To account for another portion of the common mass, we must remark, that the animal fluid is considerably different in its qualities from the vegetable matter of which it is often entirely formed, and that this vegetable matter, after it has been taken into the body, is thus changed by the peculiar powers of the animal œconomy. This change, however, is only gradually and slowly made; and it is not completed till the aliments and chyle made of them are taken into the blood-vessels; and probably even in these, it requires some time to be finished. From hence we may perceive that a portion of the common mass is always for some time in an unassimilated state: and we have thus a view of the common mass as being made up of three several parts; the one being a portion of unassimilated matter, which is to be formed into the animal mixt; the second being the animal mixt completely formed; and the third being formed from that mixt in its progress towards putrefaction. Although, therefore, the matter may be seemingly different in its different states, we find nothing to lead us

to

to doubt of its being always made of the ſame alimentary matter.

As it appears probable that the whole of the circulating or common maſs conſiſts very entirely of the matters juſt now mentioned, ſo we are diſpoſed to conclude that a different kind of aliment is not neceſſary to form the fluids from that which is neceſſary to form the ſolid parts of the body.

In admitting this, however, a difficulty will occur from our obſerving that there is a portion of the common maſs, and that alſo conſtantly, preſent in it, which is peculiarly different from the gluten in any of the ſtates of it which we have mentioned. This portion of it is that of the *Red globules;* the formation of which from any ſtate of the gluten, cannot, ſo far as I know, be explained; and it might therefore be ſuppoſed, that a peculiar kind of alimentary matter afforded this peculiar portion of the blood. It may poſſibly be ſo; but ſo far as I am acquainted with the ſubject, we do not know any part of the alimentary matters that ſeems adapted to this purpoſe: and as the red globules ſeem to be commonly in the ſame proportion to the gluten, and, the vigour of the conſtitution being given, that the quantity of both is in proportion to the quantity of the ſame kind of aliment taken in; ſo we may preſume that the red globules, by certain powers of the animal œconomy, are made of the ſame aliment as the gluten. Again, therefore, I conclude, that there is no ground for ſuppoſing the aliment ſupplying the fluids of the common maſs to be anywiſe different from that which is fitted for ſupplying the matter of the ſolids.

Another queſtion, however, might ſtill ariſe, which is, Whether any of the ſecreted fluids found out of the courſe of the circulation, but neceſſary to the animal œconomy, require an aliment different from what is neceſſary to form the fluids of the common maſs in the manner we have ſuppoſed? The negative of this we cannot indeed aſſert, but can juſtly ſay, that the affirmative is a gratuitous ſuppoſition without any proof. Indeed, while we can account for the production of the common maſs from the aliments taken in, and at the ſame time pretty clearly perceive that the whole of the ſecreted fluids are drawn entirely from that

that mass, it will be with greater probability supposed, that the secreted fluids are, by the wonderful power of secretion, formed out of the common mass by a combination of the different states of that, or of different secretions, than that any of them are formed of peculiar aliments. Upon the whole, therefore, I again conclude, that the solids, and the whole of the fluids, are formed out of one and the same kind of aliment.

To ascertain exactly what that common aliment is, or if ascertained, to explain how it is adapted to its purpose, may perhaps go beyond our power; but in all such inquiries upon an analytical plan, it may be of great advantage to simplify the question as much as may be, and to begin at least with reducing the inquiry to the fewest questions possible.

Upon this plan, therefore, I enter upon the general question, What are the proper aliments of the human species? In answer to this, we know in general from experience, that the human aliments are taken entirely either from other animals, or from vegetables, and that no part of them excepting water is taken from the fossil kingdom. The substances employed are seemingly various; and in order to know the greater or less fitness of the individuals, it is requisite to consider in general how animal and vegetable matters are suited to give nourishment to the human body.

With respect to the former, the most part of the matter taken from animals are so nearly of the same qualities with the matter of the human body, that there is little difficulty in supposing that the animal matters taken in the human body, as aliments, are perfectly well suited to this purpose, and requiring only the means of solution and mixture, with very little change of their qualities. It is true, indeed, that in many of the animal substances we take in, the likeness of qualities to those of the human body is not always exact and complete; and we shall hereafter have occasion to take notice of this: but in the mean while, all of them agree so much in the qualities which chiefly characterise the human fluids, that we may presume on their being a matter so nearly

nearly the ſame, that the former may be very well ſuited to ſupply the latter.

To ſuperſede, however, any further anxious inquiry upon this ſubject, we may remark it to be highly probable, that all animal matter is originally formed of vegetable; becauſe all animals either feed directly and entirely on vegetables, or upon other animals that do ſo. From hence it is probable, that all animal ſubſtances may be traced to a vegetable origin; and therefore if we would inquire into the production of animal matter, we muſt firſt inquire in what manner vegetable matter may be converted into animal? And this queſtion relates eſpecially to the human body; the nouriſhment of which is in a great meaſure immediately taken from vegetables.

In attempting this, we ſhall find that the converſion mentioned is the effect of a peculiar power in the animal œconomy; which it muſt be acknowledged is by no means clearly or fully underſtood. We ſhall, however, make ſome ſteps towards underſtanding it better; and to this purpoſe there is one ſtep abſolutely neceſſary, which is, to determine amongſt the ſeemingly great variety of vegetable matter, which is the kind that is eſpecially, or perhaps only, fitted to be converted into animal? Or if this queſtion, as thus put, be too general, it may then be to determine, what are the vegetable ſubſtances chiefly fitted for being converted into the ſubſtance of the human body? Nothing is more evident than that every vegetable, or every part of any one vegetable, is not ſuited to this laſt mentioned purpoſe; and therefore it is neceſſary, both for the ſake of the general queſtion, and alſo for the particular purpoſe of the materia medica, to determine as well as we are able what vegetables, and what part of them, are moſt fit for the nouriſhment of the human body.

On purſuing this inquiry, it is to be remarked, in the firſt place, that for the moſt part thoſe vegetables are rejected from the liſt of aliments that are imbued with any ſtrong odour or taſte; and at leaſt of the ſapid, all except the acid and ſweet are excluded. To this perhaps there are a few exceptions; as when the odorous or ſapid part is in ſmall proportion to the reſt of the vegetable ſubſtance; when the odo-

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rous or ſapid parts are ſuch as paſs quickly out of the body again by the excretions; or when they are ſuch as admit of their qualities being entirely changed by the powers of digeſtion in the firſt paſſages. Such exceptions, however, hardly affect the general doctrine; which is very much confirmed by this, that ſeveral vegetables which in their acrid ſtate are unfit or even noxious, by being deprived of their acrimony by culture, by blanching, by drying, or by boiling, are rendered quite proper: and if there ſhall ſtill be exceptions not to be accounted for in any of theſe ways, I would maintain, that ſuch acrid ſubſtances are admitted and taken in as condiments rather than as nutriments.

This conſideration of the excluſion of acrid matters from among our foods, is to be applied in this manner. As the acrid, odorous, or ſapid parts, ſeem for the moſt part to be the peculiar matter of particular vegetables, and to be even but a ſmall portion of theſe, ſeldom diffuſed over the whole, but depoſited in certain parts of them only; and as this is more eſpecially the caſe in thoſe vegetables which are taken in as food; ſo we from thence conclude, that beſides theſe peculiar matters, there is in the moſt part of vegetables a conſiderable quantity of matter, which, for reaſons to be given hereafter, is manifeſtly in common to almoſt the whole of the vegetable kingdom. This we ſhall ſpeak of as the common matter of vegetables, and having laid aſide as above the peculiar, it is in the common matter that we are neceſſarily led to ſeek the vegetable ſubſtance that is ſuited to the nouriſhment of the human body.

Whilſt from this conſideration it appears that a great portion of vegetables is of an alimentary quality, at the ſame time it is from daily experience evident, that certain vegetables contain a greater portion of this alimentary matter than others, and that certain parts of vegetables contain more of it than other parts of them.

It is therefore further neceſſary to inquire after the particular ſubſtance of vegetables, or the particular parts of them that may be conſidered as the alimentary matter eſpecially adapted to the human body.

In attempting this, it muſt, in the firſt place, be obſerved, that, contrary to what others have ſuppoſed, I cannot diſcern

cern that any portion of matter is to be found exiſting in any vegetables directly fitted to ſupply the animal fluid. This, however, as we have already ſaid, is ſeemingly, together with water, the foundation of all other fluids in animal bodies; and particularly, that from which the nutritious matter applied to the increaſe of the ſolid parts is, by the powers of the œconomy, formed and prepared. It is this animal fluid, therefore, that our vegetable food is to be converted into; and it ſeems to be a matter formed not from any one kind, but, by the powers of the animal œconomy, from various kinds of vegetable matter. Accordingly, when we are to ſay that certain parts of vegetables are alimentary, we mean only to ſay that they are matters fitted to enter into the compoſition of the proper animal fluid.

In ſtudying this ſubject, it appears that the matter of vegetables, whether in the whole or in the different parts of them, fitted to form the animal fluid, is an acid, a ſugar, and an oil.

Theſe three ſubſtances I ſhall now conſider more particularly; and ſhall firſt endeavour to ſhew that they truly enter into the compoſition of the animal fluid.

ARTICLE I. *Of Acid.*

That this is a part of the common matter of vegetables which proves alimentary, will be readily admitted, becauſe it appears in the whole ſubſtance of many of our vegetable foods, and particularly is frequently very copious in vegetable fruits. In theſe, indeed, it is commonly combined with more or leſs of ſugar; but from what happens in the progreſs of the maturation of fruits, which is often the change of an acid into a ſaccharine matter, it is to be preſumed that an acid enters largely into the compoſition of ſugar, and is thereby, as will be ſhown hereafter, a neceſſary ingredient in the compoſition of animal fluid. It may perhaps be alleged, that it is only ſuch an ingredient as being a part of ſugar; but it ſeems probable that it is alſo ſuch in its ſeparate ſtate. It ſeems indeed ſufficiently proved, that every kind of vegetable aliment, except the purely oily, is capable of an aceſcent fermentation; and that every ſuch aliment, ſoon after it is taken into the ſtomach of an healthy perſon, undergoes ſuch a fermentation; whereby an acid is always more or leſs evolved.

evolved. At the same time it must be allowed, that as in the further progress of the aliment this acid disappears very entirely, without being ever again evident in the mass of blood; so its having entered into the composition of the animal fluid can hardly be doubted: and if this appearance and disappearance of acid constantly takes place, we may I think conclude from it, that an acid, purely as such, is a necessary ingredient in the composition of the animal fluid.

The same thing appears likewise from this, that acescent substances are so far a necessary part of the human aliment, that without these the animal fluid advances much faster and further towards a putrid state; and it appears more clearly still from this, that when the fluids have proceeded too far in their putrescency, so as to form a disease such as I take the scurvy to be, we know that this state is especially cured by the taking in of acescent aliment. It may perhaps be cured by every kind of such aliment; but still it is done most effectually by those in a very acid state, either produced by nature, as in lemons, or by vegetables converted by art into an acid state, as in sour kraut. In the use of these, as there is no evidence of their acting otherwise, they must certainly operate by entering into the composition of the animal fluid, and by rendering it of a less putrescent kind. It is upon the whole, therefore, extremely probable, that a vegetable acid in every shape is a proper and necessary part of the human aliment.

It is, however, proper to remark here, that this conclusion respects the native acid of vegetables only; for we have reason to believe that the several fossil acids do not enter into the composition of the animal fluid, not only because they readily pass unchanged by the excretions, but because even in the circulation they continue separate from the other parts of the blood, so much as to irritate ulcers and issues; and lastly because they do not cure the scurvy.

How it may happen with respect to the phosphoric acid, the acid of borax, of amber, and some others, we do not very certainly know; but I am inclined to be of opinion, that all these just now mentioned are precisely in the condition of the fossil acids. It is to be suspected also, that it is the same with regard to certain acids that may be called vegetable; such

ſuch as the acid of tartar, the diſtilled acid as it is obtained from tar, and even that it is ſo likewiſe with reſpect to the fermented acid or vinegar, when taken in large quantity. If the latter, as has been alleged, is found to increaſe coughing, it would ſhew that it remains in a ſeperate ſtate, and thereby ſtimulates the bronchiæ; but it is likely that this happens only in conſequence of its being taken in very large quantity: for it is very probable, from its being ſo largely employed in diet by a great part of mankind, that it enters even in large quantity into the compoſition of the animal fluid. Upon the whole, therefore, it would appear that the alimentary quality of acid is confined to the native acid of vegetables, as it is produced in them by nature, or as it is evolved from aceſcent vegetables, or from ſugar in the ſtomach. Upon this occaſion, what notice is to be taken of the aerial or mephitic acid, I am not well determined to ſay.

ARTICLE II. *Of Sugar.*

The ſecond kind of vegetable matter which we have ſaid may be ſuppoſed to be alimentary, is ſugar. Whether this in its pure ſaline ſtate, and taken by itſelf, without any mixture of oleaginous matter, can prove alimentary, ſeems to me very doubtful; but that even when approaching very nearly to a ſaline ſtate, as it is in the ſugar-cane, it may prove alimentary, is preſumed from what happens to the negroes upon our ſugar plantations, who are obſerved to grow plump and fat when during the expreſſion of the canes they take a great deal of the cane-juice.

The ſame concluſion may be drawn likewiſe from this circumſtance, that the people of warmer climates live very much upon fruits, whoſe ſubſtance in a great part conſiſts of ſugar; and I think it evidently appears that theſe fruits are more nouriſhing in proportion as they contain more of ſugar. That ſugar enters for a large ſhare into the nouriſhment of men, we may know particularly from hence, that figs, a very ſaccharine fruit, were anciently the chief food of the Athletæ or public wreſtlers.

That the roots of theſe vegetables that are eſpecially alimentary contain a great deal of ſugar, we learn from Mr. MARGRAAF's

MARGRAAF's experiments, which ſhew that a great deal of pure ſugar may be extracted from them; and it can hardly be doubted that a great part of their nutritious power depends upon this ingredient in their compoſition.

The beſt proof, however, of the nutritious quality of ſugar, or of its being a chief part of alimentary ſubſtances, is, that a great proportion of ſugar is contained in all farinaceous matter. This appears from its being evolved in the moſt part of the farinaceous ſeeds by their germination or malting. And laſtly, that all alimentary vegetables do for a great part conſiſt of ſugar, we may preſume from their being univerſally liable to a vinous or acetous fermentation; the ſubject of which is probably in all caſes a ſugar.

The affinity between ſaccharine and farinaceous matter appears particularly from this, that ſeveral fruits which at a certain period of their maturation are chiefly ſaccharine, are in their further progreſs often changed to a farinaceous ſtate. The germination of ſeeds, therefore, and the maturation of certain fruits, fully prove the mutual convertibility of ſugar and farina into one another.

While we thus endeavour to ſhew that farinaceous ſubſtances contain a large proportion of ſaccharine matter, it is to be obſerved that the farinaceous ſeeds are of all other vegetable matters the moſt powerful and nouriſhing to men, as well as to domeſtic animals; and hence the *Farina Alibilis* of Dr. HALLER. This nutritious quality he indeed imputes to a mucilaginous or gelatinous matter which appears in them upon their being diffuſed in water; and it is poſſible that their nutritious quality may in part depend upon this: but at the ſame time, from what we have juſt now ſaid of the compoſition of farinaceous matter, it will appear that this vegetable mucilage or gelatina conſiſts for a great part of ſugar; which, therefore, may ſtill be the baſis of its alimentary part. We allow it, however, to be alſo probable, that farina conſiſts of another matter, which may be ſuppoſed to give the whole its gelatinous appearance in ſolution, and probably alſo to render the whole a more proper, complete, and powerful nouriſhment to the human body. This other ingredient of farina is probably an oil of that mild and unctuous kind that is got from many farinaceous ſeeds by expreſſion; and is therefore commonly named by the general title of an Expreſſed Oil.

ARTICLE

ARTICLE III. *Of Oil.*

This leads us to conſider what we ſuppoſe to be the other part of vegetable aliment. If farinaceous matters prove, as I have alleged, the moſt nouriſhing of vegetable aliments, it is equally evident that the moſt oily of vegetable ſeeds are the moſt nouriſhing of the farinacea; and from hence it will be ſufficiently probable that oil, ſuch as the expreſſed we have mentioned, makes a conſiderable part of our vegetable aliments.

Here, however, it may be imagined, that oil enters into the compoſition of the animal fluid only as it is a part of farina, or as it happens to be mixed by nature with other vegetable matter; and that, as it is taken in, whether from animals or vegetables in a ſeparate ſtate, it affords only the oily matter that is neceſſary to be conſtantly preſent in conſiderable quantity in the bodies of animals, not for their nouriſhment, but for certain other purpoſes of their œconomy.

We cannot, however, enter into this opinion: for we are perſuaded, that even the oil which is taken into the body in the form of a pure oil, though entirely ſeparate from other vegetable matter, does truly in a large proportion enter into the compoſition of the animal fluid; and that oil, therefore, may be conſidered in the ſtricteſt ſenſe as a fundamental part of the human aliment.

We are of this perſuaſion, how much ſoever neglected by phyſiologiſts, from the following conſiderations.

1*ſt*, We obſerve that oil, both from vegetable and animal ſubſtances, is daily taken in as a part of diet by the people of all nations, and often in large quantity, without increaſing obeſity. It appears likewiſe that this oil does not remain ſeparate from the other fluids of the alimentary canal, but is very accurately diffuſed in the chyle; which may be conſidered as a ſtep towards a more intimate mixture.

2*dly*, That such a mixture actually takes place is very probable from this, that no chyle appears in the left ventricle of the heart, nor in the arteries and veins which carry the blood which has passed through the ventricle. If there be some instances of such appearance, which have been alleged, they are certainly, however, very rare, and probably morbid.

3*dly*, Not only no chyle, but neither does any oil ever appear in any part of the mass of blood, nor ever in any part of the human body, till it appears in the cellular or adipose membrane, into which it is probably brought by a peculiar secretion It has indeed been alleged, that oil has sometimes appeared on the surface of extravasated blood or serum; but in all such instances, we presume it to have been a preternatural appearance: For in the many hundred instances in which I have looked upon the human blood, I have never met with any appearance of that kind; and whilst oil is so constantly and copiously taken into the body, nothing can account for the absence of its appearance, but the supposition of its having undergone an intimate mixture of it with the other parts of the blood.

Some physiologists have been fond of finding the red globules of the blood to be an oily matter; and in certain conditions these may appear to be inflammable: but a fluid readily, equally, and permanently diffusible in water, cannot be properly considered as an oil.

A *fourth* consideration that leads to suppose the oil taken in, to be intimately mixed with the other parts of the animal fluid, and to make a considerable part in the composition of it, is this, that the oil, which is often copiously laid up in the adipose membrane of healthy animals, is again, upon various occasions, absorbed and taken into the course of the circulation. Some of these occasions are manifestly those states in which a great degree of acrimony prevails in the mass of blood, as in scorbutic, siphylitic, hectic, and other such cases; and while it is highly probable that the purpose of such absorption is by the oil to cover the acrimony of the animal fluid, it must prove at the same time that this admits of an intimate mixture with the oil.

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As the want of food is a principal occaſion of the abſorption mentioned, this affords a proof that ſuch abſorption is a means of ſupplying aliment, or at leaſt of covering the acrimony which upon the want of aliment is ready to take place. Upon either ſuppoſition, it affords a proof that oil unites very intimately with the other parts of the blood: and, upon the whole, there can be little doubt that oil taken in, either in its ſeparate or united ſtate, is a part, and a conſiderable part, of the human aliment.

We have now endeavoured to determine that there are three kinds of vegetable matter which ſeparately, or rather as united together, afford the proper aliment of man; and we are diſpoſed to ſay there are no others: but it has been, and ſtill may be, by many ſuſpected, that there is a fourth ſpecies of vegetable matter which ſhould be taken into our account; and that is the mucilaginous part of vegetables.

It ſeems indeed to be very well aſcertained, that gum Arabic, the moſt ſimple and pure mucilage, is an alimentary matter; and as a gelatinous matter is commonly ſuppoſed to be the form in which our nutritious juice is applied, it may be ſuppoſed that this mucilage of gum Arabic is to be conſidered as a ſimple ſubſtance, and in the ſame form directly applicable to the nouriſhment of the body. Perhaps it may be ſo; but many objections may be raiſed againſt the concluſion. At preſent it will be enough to ſay, that the gum mentioned is not a ſimple ſubſtance, but a compound of acid, ſugar, and oil, and that thereby only it becomes nutritious. In its powdery form it reſembles farina; and a further analogy may be drawn from hence, that ſalep in its entire form reſembles very exactly the gum, and in its powdery form comes ſtill nearer to the appearance and properties of a farina. The concluſion of a ſimilar nature in theſe ſubſtances will be ſtill more readily admitted, when it is conſidered how nearly the amylaceous part of farina reſembles the ſalep and gum in a powdered ſtate; and it may be readily admitted, that the only difference between gum Arabic and farina may be a little difference in the proportion of the ſeveral parts compoſing each. It may be ſuppoſed, therefore, that gum Arabic, and other ſuch mucilaginous matters, may be like farina chiefly compoſed of ſugar and oil, which the vegetable œconomy may combine in different

proportions, and under different appearances, which we cannot either imitate or explain.

This further remark is to be added, that gum Arabic contains a portion of ſugar ſeems probable from the experiment which ſhows, that an acid exactly reſembling the acid of ſugar may be extracted from the gum, by a proceſs like to that which extracts the acid from ſugar itſelf.

It is again, therefore, concluded, that the vegetable matters affording aliment are acid, ſugar, and oil, which in diet may be taken in, ſometimes in their ſeparate ſtate; but may alſo, as they are more commonly, and perhaps more properly, be taken in in a combined ſtate; and in the latter caſe, either as they are combined in vegetable ſubſtances by nature, or as they are joined together by the cook in the preparations of diet.

Some time ago we ſhould have reſted in this concluſion; but the experiments of BECCARIA, confirmed by KESSELMAIER and many others, have diſcovered a ſubſtance in certain vegetables, which probably makes a part of the nouriſhment which they afford. Although this peculiar matter has hitherto been diſcovered almoſt only in wheat, it is probably alſo in ſome proportion preſent in the other farinacea; as theſe are all of them coagulable and nouriſhing, and many of them are nearly, if not as much, nutrient as wheat is. But however this may be, the diſcovery of BECCARIA can amount to this only, that beſides the parts we have aſſigned, there may be in certain vegetables a ſubſtance that makes a part of the aliment they afford; and juſtly indeed, as this newly diſcovered matter in its nature approaches more nearly to the nature of animal ſubſtance than any other part of vegetable matter we know of: but with all this we cannot find that this diſcovery invalidates our opinion of the chief part of the aliment afforded by vegetables being afforded by acid, ſugar, and oil, to be compounded by the powers of the animal œconomy.

Beſides the conſideration of alimentary vegetables with reſpect to their conſtituent parts, there may be another general conſideration of them proper here, and that is with reſpect

reſpect to their being of different degrees of ſolubility in the human ſtomach.

What may be the power of the gaſtric menſtruum, or the cauſes of its different power with reſpect to different ſubſtances, is not well aſcertained: but we now know that it is different in different animals, inſomuch that in many carnivorous animals it has little power with reſpect to vegetable matters; and that in phytivorous animals it has little power with reſpect to animal ſubſtances. See STEVENS *De Alimentorum Concoctione, Edinb.* 1777.

Although in the human ſtomach the gaſtric menſtruum ſeems commonly to have power with reſpect to both animal and vegetable matters, it is, however, probable, that upon different occaſions its power is in a different degree with reſpect to theſe different ſubſtances; as it ſeems at certain times to diſſolve the one more readily than the other. What this depends upon, or under what different modifications it may appear, we cannot at preſent venture to determine.

At preſent it ſeems further neceſſary to remark, that with reſpect to perhaps every human ſtomach, the powers of it in general being given, there is a difference in the ſolution of different ſubſtances, ariſing entirely from the different texture of theſe. Thus it appears, that apple and melon are leſs readily ſoluble than ſtrawberries and raſpberries; that full grown cabbage is leſs ſoluble than collyflower; and a like difference may be obſerved with reſpect to many other vegetable ſubſtances, as we ſhall hereafter take notice of more particularly. In the mean time it may, in illuſtration of the whole, be in general obſerved, that in many vegetables there is a different ſolubility in the different parts of them; ſo that in one and the ſame, while a certain part of them is entirely diſſolved, another part of them paſſes off by ſtool in a very entire ſtate. Thus as many fruits conſiſt of a tender pulp incloſed in a firmer membrane or huſk, ſo the ſolubility of the whole will depend upon the proportion of theſe parts: and as in the maturation of fruits their pulp goes on increaſing, while their membranes are conſtantly growing thinner and tenderer; ſo in many inſtances the ſolubility of fruits taken in an entire ſtate will commonly be in proportion to their maturity.

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In illuſtration of this ſubject of the ſolubility of aliments, it may be remarked, that in ſo far as the arts of cookery render the texture of aliments more tender, it renders them in proportion more ſoluble in the ſtomach.

At entering upon this ſubject, I ſhould have obſerved, that we have a particular proof of the more ready or difficult ſolubility of different ſubſtances in the ſtomach. There are men who are occaſionally, and many who are very frequently, liable to a rumination, or the bringing up by an eructation a part of the contents of the ſtomach. Theſe parts are frequently ſomewhat entire portions of vegetable or animal matters, which are manifeſtly of a firmer texture than the reſt which had been taken down, and have not therefore been ſo readily diſſolved. From the rarefaction of their air not entirely extricated, they float near to the upper orifice of the ſtomach, and are therefore moſt readily brought up. I have known ſeveral perſons liable to this rumination, and from them have learned, that certain ſubſtances are more commonly brought up than others, and ſome at a longer time after eating than others; and both circumſtances ſeem clearly to depend upon the different degrees of ſolubility in theſe ſubſtances.

Having now finiſhed the general conſideration of alimentary matters, I proceed to the conſideration of particulars.

CHAP.

CHAPTER II.

OF PARTICULAR ALIMENTS.

WE are to consider these under the separate titles of Meats and Drinks: and by the first we mean whatever, whether solid or liquid, may be considered as alimentary in the sense explained above; and by the second, what is especially, and almost only, fitted to give liquidity to the aliments, and supply the water necessary to the body. It is indeed true, that the liquids employed for that purpose may often also introduce nourishment; but under the title of Drinks, we shall consider the matter only as it affords a liquid.

The particular alimentary matters shall be considered under the two heads of Vegetable or Animal: but to these I shall subjoin the consideration of Condiments, which though not alimentary, yet, as always taken in along with these, and giving a particular modification of them, they will be most properly considered immediately after the consideration of the proper aliments themselves.

SECT.

SECT. I.

Of VEGETABLE ALIMENTS.

THE nature of vegetable aliment in general I have already conſidered very fully; and am now to conſider the particular vegetables or part of vegetables in which it is to be found: but in the whole of this, we are to mention thoſe parts of diet only which are well known and commonly employed in Britain. We have arranged them, in the firſt place, as they are taken from the different parts of plants; and at the ſame time we have endeavoured, wherever we can, to mark the botanical affinities of the plants from whence they are taken. We have attempted alſo to arrange the ſeveral vegetable aliments according to the quantity of nouriſhment that each of them affords; beginning with thoſe of the leaſt, and proceeding to thoſe which afford the greateſt proportion of it: but in this reſpect we cannot execute our plan with any great degree of exactneſs and preciſion.

Having thus ſettled as well as I can the circumſtances of order, we enter upon particulars; and firſt of the Fructus Horæi or Summer Fruits, or, as they may be properly named, the Acido-dulces.

A. a. *Fructus Acido-dulces, or Summer Fruits.*

The particulars to be conſidered here are enumerated ſeparately in the table given above; but they have all of them ſo many qualities in common with one another, that it will be proper to conſider theſe common qualities firſt, and afterwards what may be peculiar to any of the particulars.

They are all of them uſeful in quenching thirſt, which they do partly by their cooling quality and partly by their ſtimulating

lating and drawing forth a liquid from the mucous excretories of the mouth and fauces. Taken down into the ſtomach, they have the ſame effect there; and ſometimes further, by correcting putreſcency, they remove a powerful cauſe of thirſt.

In the ſtomach, our fruits give to the ſenſible parts a ſtimulus that excites appetite; and at the ſame time they prove refrigerant, and diminiſh the action of the ſanguiferous ſyſtem. This effect is from the ſtomach communicated to the reſt of the ſyſtem; and this, joined with their antiſeptic power, renders them of the greateſt utility in every kind of febrile diſorder. Their power in this reſpect has been taken notice of by every writer on the ſubject; but whether they may be uſeful alſo in diminiſhing the tenſion of the ſyſtem in other caſes, is not determined. VAN SWIETEN's obſervation of the effects of a large quantity of cherries in the cure of a maniac, and ſome other obſervations of the like effects of a large quantity of fruits, in certain melancholic caſes, look like ſuch a power. Theſe effects, indeed, may be imputed to the conſtant diarrhœa which ſuch large quantities of freſh fruits produce; but we are at the ſame time well perſuaded of their general refrigerant and ſedative power: and to this we aſcribe their effects in the caſes mentioned; in which opinion we are ſtrongly confirmed by their power in producing dyſpepſia and atonic gout. The ſame conſideration alſo leads us to believe that in many caſes they may favour the coming on of intermittent fevers, as GALEN has alleged. There may indeed be many inſtances of their being uſed without their having had that effect; but it will ſtill be certain that freſh fruits often ſhow a debilitating power, which may certainly favour the operation of marſh effluvia, in bringing on agues, and readily occaſion a return of them when they had ſeemed to have ceaſed.

The effects hitherto mentioned depend eſpecially upon the acid preſent in the compoſition of fruits, and which acid we have aſſerted above to enter in a certain proportion into the compoſition of the animal fluid. It therefore becomes neceſſary in the ſtomach; but it may be there in exceſs, may increaſe the aceſcent fermentation which happens there, and may thereby give occaſion to the production of more acid than the other fluids of the ſtomach can properly involve. In this manner,

manner, therefore, they may give occaſion to all the diſorders of an exceſs of acidity in the ſtomach, which phyſicians are very well acquainted with.

The acidity taken in, or naturally produced, always ſubſiſts in a certain meaſure in the ſtomach; but carried into the inteſtines is there mixed with the bile, by which it is more entirely involved: and as we know that acid united with the bile takes off its bitterneſs, it is probable that acid fruits taken in are often uſeful in obviating the diſorders that might ariſe from the redundancy of bile, and perhaps from the acrid quality of it. On the other hand, however, if the acids are in greater quantity than can be, or are, properly corrected by the bile preſent, they ſeem, by ſome union with that fluid, to acquire a purgative quality, that gives a diarrhœa, and the colic pains that are ready to accompany the operation of every purgative.

From the involution of acids, which even happens in the ſtomach, and more completely in the duodenum, we muſt perceive that, as we have maintained above, they are mixed with the human fluids; and the ſame alſo renders the other part of our doctrine probable, that they enter for a part into the compoſition of the proper animal fluid, to be thereby rendered leſs putreſcent than it would otherwiſe be. Acids indeed are univerſally acknowledged to reſiſt putrefaction; and hence the inſtinct of man leading him to the uſe of theſe fruits in warm climates, in warm ſeaſons, and in every other circumſtance that is known to increaſe a tendency to putrefaction. The ſtate of the fluids in the ſcurvy may be diſputed about; but the remarkable effects of vegetable acids and aceſcents in the cure of this diſeaſe do not allow us to doubt of their manner of operating, and therefore of the nature of the diſeaſe.

We have hitherto taken notice almoſt only of the acidity of the fruits we are conſidering: but that acidity is perhaps always accompanied with more or leſs of ſugar; and thence perhaps more readily runs into a fermentation, by which their acidity, and all the effects of it mentioned, are greatly increaſed: and it is by the ſame fermentation that an unuſual quantity of air is extricated, and gives occaſion to that flatulency of the ſtomach and inteſtines with which the uſe of thoſe fruits

fruits is so commonly accompanied. We often find, however, in fruits, the acidity accompanied with, or changed into, such a quantity of saccharine matter, that both from the reasons given above, and from universal experience, our saccharine fruits must be considered as particularly nutritive, and that also in proportion to the quantity of sugar they contain. In what manner sugar enters into the composition of the animal fluid, or how it acquires the qualities it puts on in these, I cannot very clearly explain; but we can have no doubt that it does so in fact: and we are well persuaded that the saccharine matter, as well as the acid, has a share not only in obviating the putrescency of the animal fluid, but also of correcting it when it has gone too far. It is therefore justly supposed, that the resisting putrefaction and curing the scurvy are virtues in common to the whole of the summer fruits we are treating of.

We have now mentioned the qualities that can be properly taken notice of as common to the whole of these fruits; but there are some others mentioned by writers on the subject. Thus those that are accompanied with an agreeable odour are said to be cordial and analeptic. Their powers however, in these respects are too inconsiderable to be mentioned; but I dare not say so of the saponaceous and dissolving powers which are ascribed to them.

Upon this subject it is to be remarked, that the blood of phytivorous animals is perhaps more dense and cohesive than that of the carnivorous; and therefore it is difficult to determine what is the effect of aliments in this matter: but I shall consider it more fully hereafter, when I shall consider in general how far the state of the fluids can be changed, either by aliments or medicines.

The qualities we have taken notice of in fruits have their effects chiefly in the first passages, even the changes they can produce in the mass of blood are all of them, if I mistake not, begun in the same first passages; and how far they have peculiar effects in the course of the circulation, I cannot well determine. We believe they have a tendency to increase the saline state of the blood; and therefore it is very possible that when they are taken in larger proportion than usual, they may show diuretic powers; but we judge that such appear only

ly when fruits carry along with them a large proportion of water, as in the caſe of the *Water-melon.*

Having thus conſidered the qualities in common to the whole of the ſummer fruits, the peculiarities of each will be beſt explained by conſidering what happens to the moſt part of them in the progreſs of their growth and maturation. Thus, the moſt part of fruits, upon their firſt diſcovering any ſucculency, have that more or leſs acerb; but upon their ſucculency being advanced, there is more acidity evolved, and leſs acerbity is perceived. As the growth of fruits advances, if they are ſuch as are capable of acquiring ſweetneſs, this appears more and more, while the acerbity and acidity are conſtantly diminiſhing, and ſometimes in their ſtate of perfect maturity, a full and almoſt unmixed degree of ſweetneſs prevails.

With theſe changes of their juices, it is to be remarked, that at the ſame time fruits ſuffer a change in their texture. At firſt they are firm and denſe; but as their ſucculency advances, they are conſtantly becoming more ſoft and tender; and with their maturity they acquire the moſt ſucculent and tender ſtate they are capable of. In the moſt part of fruits, we can diſtinguiſh between the ſofter pulp and firmer cortical part; and in the progreſs of their maturation, we find their pulp, in the innermoſt parts, conſtantly increaſing, while the firmer and external cortical part is conſtantly diminiſhing. After fruits have in theſe reſpects of their juices and texture acquired their maturity, they ſuffer ſome further changes, to a farinaceous or to a putrid ſtate, which I cannot explain; but as theſe changes hardly give any qualities to be taken notice of, either in diet or medicine, I ſhall not attempt to give any account of them.

Having now taken notice of the changes that may happen to many individuals, the peculiarities that may take place in the ſeveral genera and ſpecies may be readily diſtinguiſhed. Thus ſome fruits remain conſtantly in an acerb ſtate, while others advance to a more pure acidity, hardly acquiring any ſweetneſs. A third kind advances to a ſweet ſtate, ſtill retaining more or leſs of their acidity; while others retaining little or none at all of this, acquire a full ſweetneſs. Upon theſe circumſtances, as they take place in particular fruits, both the

the diætetic qualities and medicinal powers of each may be aſcertained by a little experience of the taſte in all the ſeveral ſtates of growth and maturity they are capable of.

It is to be further obſerved, that the qualities of fruits as alimentary depend almoſt entirely upon the quantity of ſaccharine matter they can acquire, and this upon the greateſt degree of maturity they can arrive at; ſo this will often depend upon the ſoil they grow in, and upon the climate and ſun they have been expoſed to. It is alſo to be remarked, that as the full evolution of their ſaccharine matter is the moſt perfect ſtate of alimentary fruits; ſo whatever contributes to this, may be conſidered as giving them their utmoſt perfection: and therefore when in certain climates fruits cannot be allowed to remain upon their reſpective trees to acquire their due maturity, this, however, may be ſupplied: if fruits when taken from a tree can be preſerved from froſt, or other cauſes of corruption, the proceſs of maturation ſtill goes on, and will go on to a more perfect degree in evolving the ſaccharine matter, and in giving a greater tenderneſs of texture. This is not always to be promoted by external heat applied; but in ſome caſes it may: and we find that certain fruits when taken from their trees, if laid in heaps, ſo as by a certain fermentation to become heated, they by this ſweating, as it is called, loſe their acerbity, and acquire more ſweetneſs than they would have otherwiſe had; and it is to the purpoſe of diet to obſerve, that by the application of an artificial heat in boiling, baking, or roaſting, acerb and unripe fruits have their ſaccharine matter much more evolved, and the effects of their unripe ſtate very much prevented; particularly, as by theſe practices a great deal of their air is extricated and diſſipated, they are leſs diſpoſed to an aceſcent fermentation.

It belongs alſo to the buſineſs of diet to remark, that perſons do often take in unripe fruits in conſiderable quantity; and much has been ſaid of the danger attending ſuch a practice; which is certainly in ſome meaſure well founded. The firmer texture of theſe unripe fruits is more difficultly diſſolved, they remain therefore long in the ſtomach unmixed with the other fluids, and they are therefore liable to acquire a greater degree of acidity, and to give all the diſorders that may ariſe from that in too great abundance. There are indeed ſtomachs whoſe gaſtric liquor may obviate all this; but certainly

certainly in many cases it may fail; and therefore the taking in of unripe fruits is always hazardous, and may be very hurtful.

We can hardly omit here saying what may perhaps be understood from what has been said already, that though fruits in their ripest, be at the same time in their most perfect, state, they may, however, even in this state, be taken in in too large quantity; and in that case, being in over-proportion to the quantity or powers of the gastric liquor, they may go too far in an acescent fermentation, and give all the disorders that may arise from too acid fruits: and that this will especially happen from fruits which have still in their ripest state a large proportion of acid in their composition.

Having now said so much of the common qualities of summer fruits, I can have few observations to make on the qualities of particular kinds. These I have said will depend on the acerb, acid, or saccharine matter, in their constitution, whether that depends upon their specific nature or upon their state of maturation; and in all cases to be readily ascertained by experience in tasting.

For the sake of young students, we shall more particularly observe, that the *Drupaceæ*, or stone-fruits, have commonly a larger proportion of acid with respect to their sugar than some other fruits; and therefore in their recent state they are commonly and justly supposed to enter more readily into a noxious fermentation, and to produce those consequences of morbid acidity, colic, and diarrhœa, which we have mentioned above. This is especially, and perhaps justly, supposed with respect to the cherry and plum kind, and we believe may be equally supposed with respect to the peaches produced in the open air in Britain; but we are disposed to judge the apricot in these respects to be the safest of the drupaceous tribe.

The *Pomaceæ*, when duly ripened, or when their immaturity is corrected by artificial heat and proper additions, may have all the common qualities of other summer fruits; but in their recent state, being seldom duly ripened in this climate, the firmness of their texture renders them slowly dissolved,

diſſolved, and ready to contribute to an exceſs of acidity in the ſtomach. This vice happens more readily with reſpect to APPLES than to PEARS, as we can at leaſt have ſome ſpecies of the latter more mellow and tender. In the caſe of a dyſpeptic ſtomach, I have known apples a long time after they had been taken down, brought up again by eructation in the ſame maſſes they had been ſwallowed, and that even after two days.

AURANTIUM. This, with the LIMONIUM, I have inſerted here amongſt the Pomaceæ, though not with ſtrict propriety, as the fruit is not a pomum. But in this inſtance, I have followed the learned Profeſſor MURRAY, who under the title of Pomaceæ has given not only the Poma, but alſo the Drupæ and Baccæ. How far this is proper I will not determine; but for my purpoſe of conſidering the diætetic qualities of fruits, I thought it fitteſt to diſtinguiſh their botanic affinities as far as I could: but I could not find a more proper place for the Aurantium and Limonium than that I have given them here.

Both theſe plants, in their leaves and flowers, and in the exterior cortical part of their fruit, have various medicinal qualities; which, according to my plan, are not to be mentioned here; where I am to conſider only the qualities of the juice of their fruits, the only part of them employed in diet.

The juices of theſe fruits we conſider as purely acid, to be more eaſily collected in large quantity than from almoſt any other fruit; and therefore they are more frequently than that of any other employed. Wherever an acid is indicated and admiſſible, they anſwer every purpoſe which we have propoſed above for acids in general, whether in the mouth and fauces, or in the ſtomach and inteſtines. They certainly enter into the compoſition of the animal fluid; and accordingly much experience has pointed them out as the moſt uſeful both in preventing and curing the ſcurvy.

They are of two kinds. One in which they are more purely acid, with very little ſaccharine matter joined to them: the other is that in which a conſiderable portion of ſugar is joined with the acid; by which it may be conſidered as in

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ſome meaſure nutritive. This, however, is little attended to; and they are ſeldom employed as a nutriment. This only is to be remarked, that the CHINA or *Sweet Orange* has, in a certain degree, every quality that can be aſcribed to any of the fructus acido-dulces.

Theſe are the virtues of theſe acids: but it muſt be obſerved, that wherever acids can be hurtful, theſe either in undue quantity, or in dyſpeptic ſtomachs, are as readily noxious as any other.

On the whole of the ſubject, I have only further to obſerve, that as the fruits mentioned are the fruits of a ſeaſon, it is often neceſſary to preſerve their juice in its entire acid ſtate for ſome length of time; and for this purpoſe various meaſures have been propoſed. What may be done by congelation I cannot determine, as it is very rarely that this climate allows of the experiment. The practice by evaporation, or the making it into a rob, has been that moſt commonly employed, and has been much commended by many perſons; but in many trials which I have made, I could not exhale it to ſuch a conſiſtence as would preſerve it without addition, without my finding the acid a good deal changed. It acquires an acerbity and ſtypticity that does not allow it to be readily diffuſed in water; and I ſuſpect it is not ſo readily miſcible with the animal fluids as in its entire ſtate. From FORSTER'S obſervations in the voyage round the world, it was not found uſeful either in preventing or curing the ſcurvy; which perhaps may be accounted for, partly by the concentration bringing it nearer to the ſtate of the foſſil acids, or poſſibly by the diſſipation of ſome volatile parts, perhaps a portion of aerial acid; both of which circumſtances may render it leſs fit for the cure of the ſcurvy. I have therefore a bad opinion of the acid exhaled to a thick conſiſtence; and judge the beſt way of preſerving its virtues to be by a diligent depuration of it from its mucilaginous part, and putting it up in cloſe veſſels without putting any oil on its ſurface, which is ready to be acted upon by the acid, and gives a diſagreeable taint to it.

What in our catalogue are put under the title of *Senticoſæ*, as their tender ſubſtance is eaſily diſſolved, and that in their ripe ſtate they do not exceed in acidity, are juſtly reckoned the

the safest of summer fruits. If the large annual use of STRAWBERRIES could preserve from the gout, we should seldom find the inhabitants of Edinburgh affected with that disease; but though they use that supposed preservative very largely, we find them as often and as severely affected with the gout as the inhabitants of other places who do not use the same. Under the title of Senticosæ I had formerly set down the CYNOSBATOS, as it still retains a place in some dispensatories; but after much attention, I cannot find that the best kinds of this various fruit possess any peculiar qualities that should introduce them either into diet or medicine.

Of the *Ribesia*, there is a considerable difference between the RIBESIA, strictly so called, or currant, and the GROSSULARIA or gooseberry. The former has always a large proportion of acid; and though it should be more sweet, as the smallness of the berry does not easily allow it to be taken without the husk, it is a less safe fruit: whereas the Grossularia, as commonly containing a larger proportion of sugar, and as it may be easily taken without the husk, affords a safer, and generally a very safe, fruit. To the RIBES NIGRUM, some singular virtues have been ascribed; for which, upon repeated trials, I have not found any foundation.

The Vaccinia duly ripened, though retaining a good deal of acidity, are commonly easily digested; but the most agreeable species, the oxycoccus or craneberry, is still safer in its preserved than in its recent state.

UVÆ VITIS.

Every body knows that the Grape, according to somewhat specific in the nature of particular kinds, according to the soil it has grown in, the sun it has been exposed to, and its different degrees of maturation, is in very various condition; and the qualities therefore of it in its different states are to be judged of by the principles laid down above: But I think we may assert, that Grapes which contain a large proportion of sugar, are, if taken without their husks, the safest and most nutritive of summer fruits.

Of the fruits hitherto mentioned, except the vaccinia, I have considered them only as in their recent state; but it is proper to take notice of them also, as they are often used in a dried state. In this state their watery part, and perhaps

their acid and air, is in part abſtracted; and therefore their powers are in a more concentrated and perhaps improved ſtate.

Of theſe dried fruits, the PRUNES, as they contain a great deal of the acid they originally had, are more of a laxative quality than the other dried fruits. Sugar, and therefore ſaccharine fruits, have all of them ſomewhat of the ſame quality; but we are perſuaded that the laxative quality of fruits is commonly to be attributed to their acid conjoined with the bile, as above alleged.

Of the PASSULÆ MAJORES or raiſins, as very purely ſaccharine, they may be conſidered as conſiderably nutritive, and that in proportion as they are more entirely ſaccharine.

The UVÆ APYRENÆ, or corinthiacæ, otherwiſe named Paſſulæ minores, as having more of acid, are therefore with the nutritive quality of the raiſin more laxative.

The DATE of the beſt kinds is a very ſaccharine fruit, and their nutritious quality is well aſcertained by the experience of many people who live upon them very entirely. Theſe which come to us have, beſides their nutritive, no peculiar quality of aſtringent or demulcent that I can perceive.

Dried FIGS are a fruit containing a large proportion of ſugar; and by the experience of many people, conſiderably nouriſhing. They are perhaps more ſo, that their ſugar is united with a large portion of a mucilaginous matter, which we always ſuppoſe to be of an oily nature, and therefore contributing to a nutritious quality. The mucilaginous nature of Figs has given occaſion to their being conſidered as demulcent; and both theſe and the dates have been much employed in pectoral decoctions, and for moderating the acrimony of the urine in nephritic caſes; but we ſhall hereafter ſhow, that the power of demulcents, both in theſe and other ſubſtances, is a very doubtful matter. In the mean time, we are clear that the materia medica has loſt nothing by our diſpenſatories omitting the SEBESTEN and JUJUBES, dried fruits, ſomewhat of the ſame nature with the dates and figs, and formerly uſed for the ſame purpoſes.

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To the conſideration of the dried fruits, it is proper to ſubjoin the conſideration of fruits in their preſerved ſtate; which is commonly done by means of ſome boiling, and by afterwards adding to them a quantity of ſugar. In this ſtate they preſerve ſometimes their acid, and always their aceſcent and nutritive qualities; but both by the boiling employed, and the ſugar added, they are perhaps leſs liable to aceſcency; and by the latter circumſtance their nutritive qualities are certainly increaſed.

Some fruits are preſerved by being laid in brandy, or other ardent ſpirit; but this hardly preſerves in them any of their original qualities. Their aceſcency is entirely deſtroyed; and they are rendered abſolutely unfit to be employed as nutrients.

To conclude the ſubject of fruits, we ſhall conſider a queſtion which has been frequently ſtated, and that is, Whether recent fruits are moſt ſafely and uſefully taken before or after a meal or the uſe of other food? The anſwer ſeems to be very obvious. In dyſpeptic ſtomachs, or thoſe which do not eaſily or powerfully overcome aceſcency, the taking in of aceſcents muſt be leſs ſafe before a meal than after it. In the caſe of ſtomachs powerful in the digeſtion of aceſcents, theſe may be commonly taken ſafely before meals, and poſſibly often with advantage, as they may excite appetite and favour digeſtion. In the moſt part of ſtomachs, fruits in moderate quantity are ſafe after meals; and when theſe have conſiſted of much animal food, the uſe of fruits is generally proper, though in certain dyſpeptics the large uſe of them may not be always ſafe. The uſe of the dried fruits is certainly ſafer than that of the recent before meals; but even the dried fruits cannot be taken in that condition with ſufficient ſafety by the dyſpeptic. As I am well perſuaded of the nutritious quality of dried figs, I can hardly believe, with LINNÆUS, *Amæn. I.* 136, that a large quantity of theſe can be taken before a meal without any diminution, and rather with an increaſe of appetite.

With reſpect to the uſe of fruits, there is ſtill a queſtion to be mentioned. In many countries, particularly in Britain, both recent, boiled, and preſerved fruits, are often taken with milk: and this practice has been condemned by SPIEL-

MANN; but as I judge without reaſon. In this country, the practice is almoſt univerſal, without our obſerving any miſchief ariſing from it. Such experience is the moſt ſecure foundation for concluding that the practice is not hurtful; but it may be further added, that the ſuppoſition of the conſequences ariſing from it is not well founded. It is ſuppoſed they may ariſe from the coagulation of the milk in the ſtomach: but this happens to perhaps every portion of milk taken down into it; and therefore certainly happens for the moſt part without any bad conſequence. Further, however, we judge the milk may be uſeful by involving a portion of the acid, as it has been often found to be a cure for heartburn. If it happens, as commonly, that the oily part of milk is employed, it is probable that the coagulum will not be very firm, and alſo that the acid will be more properly and fully involved. As we are perſuaded that the animal fluid is always formed of acid, ſugar, and oil, ſo I judge the mixture of theſe in diet to be not only allowable, but very proper; and therefore that cream with ſtrawberries, and butter with apple-pye, make a very proper diet.

Before going further, it is to be remarked, that in treating of the above alimentary ſubſtances, we have not followed the method of other writers on the materia medica, who upon the occaſion of mentioning ſubſtances as alimentary, do at the ſame time mention the medical virtues of the other parts of the vegetable from whence the alimentary matters are taken. This, however, appears to be diſtracting the ſtudent's attention; and we have avoided it, reſolving in another, and as we judge a more proper place, to take notice of the medicinal qualities that may be in the whole, or in the parts, of alimentary vegetables; and ſhall now, therefore, in conſidering the reſt of the alimentary ſubſtances, keep to this meaſure.

After the fructus acido-dulces, the next ſet of vegetable aliments to be mentioned, are the fruits of the *Cucurbitaceæ*. This order, as we obſerved above, by no means ſhows the power of botanical affinity in giving the ſame medical virtues, to every fruit of the ſame order; but thoſe in our liſt, which are the chief of the alimentary ſubſtances taken from this order, are of a very ſimilar nature with one another. They are not ſuppoſed to be very nouriſhing; but may be truly

truly more so than is imagined: for though in the state in which they are employed, their sensible qualities do not promise much, I judge their substance to be of the nature of the farinacea, which are to be hereafter mentioned as the chief of vegetable aliments.

All of the *Cuncurbitaceæ*, by a certain maturation, are changed into a farinaceous substance; and SCOPOLI informs us, that the substance of the pompion is employed by some people in the making of bread; and that one part of that substance, with two parts of wheat-meal, may be employed for that purpose.

The CUCUMBER, as commonly employed in its unripe state, is perhaps in that condition not very nutrient; but it is so much so as to make a considerable part of the aliment of many persons in warm climates and seasons: and its aqueous, cooling, and acescent quality, render it a very proper summer aliment. The firmness, however, of its texture, occasions it often to be long retained in the stomach; whence it frequently occasions acidity and flatulency, and is therefore properly accompanied with some of the condimenta.

The MELON in its ripe state discovers some sweetness, and may therefore be more nourishing. On the same account, however, it comes nearer to the qualities of the fermentable fructus acido-dulces; and as at the same time, from the firmness of its texture, it may often show the effects of too great acescency, moderation is necessary in its use, especially by dyspeptic persons; and I think it is commonly rendered safer by the addition of sugar and aromatics. Some writers have mentioned its diuretic effects; but I cannot find these from the Melon to be more than from other aqueous food. If SANCTORIUS found Melons to diminish perspiration, they might thereby indeed increase urine, as he also observed; but all this I would impute to their refrigerant rather than to their directly diuretic powers. I have found no evidence of Melons stimulating the kidneys; and the account given by Dr. ARBUTHNOT of their giving bloody urine, is a single fact, and seems to be extravagant.

B. FOLIA *et* CAULES PLANTARUM.

Of the leaves and ſtalks of plants uſed as aliments, I have ſet down only a few, as of theſe kinds of plants few afford much nutriment; and in the liſt of nutrients given by writers, I find many of them which, both from their qualities and from the quantities in which they are employed, cannot be conſidered as nutrients ſo properly as condiments; and to that place I refer them.

Of the nutrients, I have ſet down a few under the title of *Oleraceæ*; having in view their botanical diſtinction, rather than the meaning of the term Olera as formerly employed.

Of the leaves mentioned, and ſeveral others that might have been added to the liſt, they are all of them mild and almoſt inſipid ſubſtances, with hardly any ſweet or mucilaginous taſte to diſcover a nouriſhing quality; but they are aceſcent and fermentable, and therefore muſt contain ſome portion of ſugar. They contain, however, ſo little, that they are juſtly ſuppoſed to be among the weakeſt nutriments. For the table, they are properly choſen by the tenderneſs of their texture; and therefore the SPINAGE is juſtly preferred, and is now almoſt the only one of theſe oleraceæ employed.

If the plant to which we give the name of MALVA is the ſome to which the ancients gave that appellation, I think they made a bad choice in employing it as one of the olera; for it has hardly more mucilage than the ſpinage, and cannot by any boiling be brought to be ſo tender.

The oleraceæ are commonly ſaid to be laxative; but they are no more ſo than any other vegetables capable of fermenting in the ſtomach, and that are taken into it in large quantity.

After the oleraceæ I have ſet down the BRASSICA, which, though I have diſtinguiſhed it by its botanical order, is one of thoſe which have been commonly named Olera, and is one of thoſe which were anciently, and is ſtill at preſent, in the moſt frequent uſe. I have marked it as one of the *Siliquoſæ*, for the

the ſake of obſerving, in proof of our general doctrine of vegetable aliments being thoſe moſt free from acrimony, that the braſſica is the moſt free from that peculiar acrimony which diſtinguiſhes all the other plants of the claſs of *Tetradynamia*. It is accordingly the only plant of the claſs whoſe leaves are employed as nutriments; and this circumſtance of the mildneſs, fulneſs, and conſiderable ſweetneſs of its juice, with the bulk in which it is produced, will readily ſhow why it has been at all times ſo much employed as an aliment.

One ſpecies of the braſſica, deſigned by the trivial name of *Braſſica Oleracea*, is ſuppoſed by culture and other circumſtances to have been brought to be of many varieties which put on very various appearances, and all of which, for the purpoſes of the table, are cultivated in moſt of the countries of Europe. Whether the plants under theſe different appearances are different ſpecies, or varieties of one ſpecies only, I leave to be determined by the botaniſts; and whether they be of the one kind or other, I leave the more nice and accurate diſtinction of them to the men of that ſcience: I am to ſpeak only of thoſe I am well acquainted with, and whoſe diſtinction I believe to be very commonly known and univerſally eſtabliſhed over Europe.

In all the varieties of the *Braſſica Oleracea*, I take the alimentary qualities to be very much the ſame. It is indeed poſſible they may differ in the quantity of it which they ſeverally afford; but this I have not been able to aſcertain with any preciſion. As all of them may be conſidered as a ſupplemental proviſion only, I believe they are ſeldom to be choſen by the quantity of nouriſhment they afford; and I think they are to be choſen as a part of diet by the tenderneſs of their texture, and by the fulneſs and ſweetneſs of their juice. It is probable that on many occaſions they are choſen by the bulk in which they may be produced, and by the facility with which they may be reared and preſerved in certain ſoils and climates.

Upon the firſt ground, the COLLYFLOWER and BROCCOLI are to be choſen, as the moſt tender, moſt eaſily digeſted, and leaſt flatulent.

Of

Of all thoſe kinds of which the leaves are eſpecially employed, the BRASSICA SABAUDA, or *Savoy*, appears to me to be ſweeter and more tender than any of the others I am acquainted with; and in the Savoy, I hold the central and upper leaves gathered pretty cloſely together, to be by much the tendereſt portion of the whole plant.

Thoſe kinds of the Braſſica, whoſe leaves, after a certain time of their growth, are gathered in greater quantity, and more cloſely, into a firm and globular head, are named *Braſſicæ Capitatæ*, or CABBAGE, affording the greateſt bulk of product, and perhaps the greateſt quantity of nouriſhment.

As all the Braſſicæ ſeem in a pretty firm texture, and in a very fermentable juice to contain a great quantity of air, they are all noted for producing flatulency in the bowels. As the younger plants are the moſt tender, ſo they are the leaſt flatulent; and as the formation of cabbage requires a longer time in growing, ſo cabbage acquires a firmer texture, and is noted for producing more aceſcency and flatulency than any other kind. Cabbages are by their colour diſtinguiſhed into two kinds, the *white* and the *red*; and the latter is found to be of the ſweeter and tenderer kind.

Since I firſt wrote the above, I have become acquainted with a ſpecies of Braſſica that I was not acquainted with before. This is what has been called the *Braſſica Gongylodes*, which, till I raiſed it in my own garden, was not, ſo far as I can learn, known or produced in Britain. It is diſtinguiſhed by its having on the upper part of its ſtalk a ſwelled part, or ſpheroidical tuber, which within a firm cortical part is formed of a ſubſtance of the ſame nature with that which forms the medullary part in the ſtalks of cabbage and other kinds of colewort. This medullary part, when freed from its rind, and very well boiled, is of a tender and ſweet ſubſtance, and certainly is conſiderably nouriſhing, and appears to me to be leſs flatulent than the cabbage. It is firmer in its conſiſtence, and ſweeter than the turnip; and though the hardneſs of its bark may render it unfit to be reared for the purpoſe of feeding cattle, I am of opinion, that under proper management it may afford a delicacy for the tables of men.

I have

I have thus given the choice of the ſeveral ſpecies of the Braſſica, ſo far as I am acquainted with them; and believe the principles I have made uſe of will apply to every other ſpecies, when their nature and different ſtates are properly known.

We have only to remark further, that as we have ſaid juſt now, that the whole of the ſpecies contain a great deal of air, they may be rendered fitter for diet by having a great deal of that air extricated and diſſipated before they are employed in food.

This gives us an opportunity of obſerving, that our vegetable aliment of all kinds contain a great deal of air, which diſpoſes them more to aceſcency and flatulency; and which they are more diſpoſed to produce as they are of a firmer texture, or as they are further advanced in their growth. The extrication, therefore, of a great deal of this air before they are taken into the ſtomach, is always of great ſervice in obviating the tendency mentioned. We have mentioned this particularly on the occaſion of cabbage, ſo frequently accuſed of aceſcency and flatulency, but which may, by very long boiling, be rendered almoſt as ſafe as the tendereſt vegetable. For the moſt part it may be rendered as ſafe as collyflower, to which our cooks, for the ſake of the figure it is to make upon the table, ſeldom give the boiling that is neceſſary to render it duly digeſtible.

Beſides the boiling mentioned, there ſeems to be another means of extricating the air of cabbage, by ſubjecting it to a fermentation, as in the preparation of SAUER KRAUT; a preparation ſo named in Germany, where for many ages paſt it has been a common part of diet.

This preparation has now been deſcribed in ſeveral books which are in every body's hands, and therefore need not be repeated here; and in this place it ſeems only to be neceſſary to ſay what are its qualities. As the matter has been ſubjected to an active fermentation, ſo a great deal of acid is evolved in it; and after what we have ſaid above of acid as an alimentary matter, it will be readily allowed that Sauer kraut may be conſidered as ſuch. But as the whole of the matter is not thus converted, but that a great portion of the ſaccharine matter

ter of the cabbage ſtill remains in it, ſo it will be ſtill more readily allowed that this preparation may be conſidered as alimentary, and well ſuited to the purpoſes to which it has been eſpecially applied, that is, the obviating and curing the ſcurvy.

Another ſet of the leaves, or rather ſtalks, of vegetables, which are conſidered as alimentary, are ſet down in our catalogue under the title of the *Semifloſculoſæ*, to which order they belong. They are lacteſcent plants; and like the whole, or at leaſt moſt part, of that kind, have a conſiderable acrimony in their juices. Theſe here pointed out are indeed leſs acrid than moſt other lacteſcents; but of even theſe here mentioned, it is ſtill the LACTUCA or *Lettuce* that is moſt commonly employed, as having in the ſpecies of it employed the leaſt of that acrimony that is peculiar to the order, and eſpecially at the early period of its growth at which it is taken. In this ſtate, it hardly diſcovers any thing ſweet or mucilaginous in its juice, and therefore may be ſuppoſed to give little nouriſhment, eſpecially in the raw ſtate in which it is commonly taken; but when boiled, it proves more ſweet and mucilaginous, and therefore may be ſuppoſed to go further as a nutriment. Even in its raw ſtate, as aceſcent and refrigerant, it is properly enough combined with animal food; but upon the ſame account in moſt perſons it requires the condiments that are uſually taken along with it.

Of the other *Semifloſculoſæ*, the *Succory* and *Endive*, eſpecially the latter, make frequently a part of our food; but they are hardly ever taken while they contain their peculiar acrid juices, and only when by the arts of blanching they are deprived of theſe. But even their blanched parts are left in poſſeſſion of the juice in common to vegetables; which, as we have ſaid above, is always of a fermentable nature, and therefore conſiſts of a ſaccharine and nutritious matter.

I have to ſay the ſame things of the *Taraxacum* or Dandelion. Whatever medical virtues in its natural ſtate this may be poſſeſſed of, which for the reaſons given above I do not inquire after here, it can only be employed as a part of aliment when deprived of thoſe medicinal qualities. It is in this ſtate only as it firſt ariſes out of the earth, and more eſpecially when its firſt ſhoots are become of ſome length, by their riſing out of mole-hills or other looſe earth.

After

After the *Semifloſculoſæ* which are chiefly employed in a blanched ſtate, I have ſet down the *Umbellatæ*, for the ſake of introducing a frequent article of diet, the Celeri. This is a portion of the Apium graveolens ſive paluſtre; and what may be the medical or noxious qualities of this plant, it is not our buſineſs here to determine, as it is enough for our preſent purpoſe to ſay, that the Celeri is never employed as an alimentary matter but when it is deprived of its peculiar juices by being blanched: and in this ſtate it is, on the footing of the other blanched plants, an alimentary matter ſufficiently mild and perfectly ſafe. With reſpect to it, however, in this ſtate, it is to be remarked, that it is never ſo entirely deprived of its acrimony as not to retain more taſte, and a more agreeable taſte, than the other blanched plants; and upon this account it is more generally uſed at table. Although even in its blanched ſtate, retaining a little acrimony, if it be very well boiled in water or broth, it becomes a tender mucilaginous, and therefore a nutritious, ſubſtance.

After the leaves and ſtalks of plants, I have inſerted in my catalogue an alimentary matter; which, though it cannot be ſaid to belong to the leaves or ſtalks of plants, is ſo much of an herbaceous nature, that it could not be ſo properly mentioned in any other place.

This is the *Cynara*, which I have ſet down under the title of the botanical order of Capitatæ, becauſe I believe there are ſome others of the ſame order which might be mentioned; but I mention only what I am acquainted with, the *Scolymus Cynara*, or Artichoke.

It is hardly neceſſary to ſay, that of this acrid plant the only alimentary part is the receptacle of the flower, and the portions of that which we pull away from it, in pulling away the ſeparate ſquamæ of the calyx. The whole of this receptacle, even in its recent ſtate, is of very little acrimony, and by being boiled in water is rendered perfectly mild. In its boiled ſtate, it is of a tender texture, ſomewhat ſweet and mucilaginous, and therefore tolerably nouriſhing; but it is not remarkable for any other qualities that I can perceive; and its interrupting ſleep, if ever happening, is certainly not conſtantly its effect.

After

After the alimentary leaves and ſtalks, and after the artichoke, which I conſider as akin to theſe, I have ſet down in my catalogue what may be conſidered as a part of a ſtalk, that is, the firſt ſhoots or turiones of the *Aſparagus*. There are ſome other plants whoſe turiones, though they belong to acrid plants, are ſaid to be mild and eatable, like thoſe of the aſparagus; but they do not appear to belong to any one order of plants, and I am not acquainted with the particulars.

The ſhoots of the aſparagus, or at leaſt a portion of their upper parts, when boiled in water, is very tender, ſomewhat ſweet and mucilaginous, and therefore preſumed to be conſiderably nouriſhing. When eaten in any quantity, they always ſoon after imbue the urine with a peculiar odour, which did not appear in the aſparagus before it was taken into the body. This has given occaſion to an opinion of the power of aſparagus, with reſpect to both the urine and urinary paſſages; but though frequently attending to the phenomenon mentioned, I have never found that at the ſame time the quantity of the urine was increaſed or its quality anywiſe changed.

Odours may ariſe from a very inconſiderable portion of matter, and gives no certain proof of that matter's being in large quantity preſent, or of its being very active, except in perſons of peculiar idioſyncraſy. I am therefore diſpoſed to be of opinion, that aſparagus cannot commonly do either good or ill in the urinary paſſages. The inſtances given by SCHULZIUS and BERGIUS of bloody urine, occaſioned by eating of aſparagus, are certainly very unuſual facts, and not to be applied to any extent: and if BOERHAAVE and VAN SWIETEN judged that upon ſome occaſions they had obſerved the eating of aſparagus to haſten on fits of the gout, I ſuſpect ſome fallacy in their obſervation; for I have known many inſtances of a negative to it.

C. RADICES,

C. RADICES, ROOTS.

The roots of plants commonly contain more nutritious matter than their leaves; and the experiments of Mr. PARMENTIER in his *Recherches ſur les Vegetaux Nouriſſants*, ſhow that a great number of roots never before thought of as eſculent, do however contain a quantity of farinaceous matter, which may upon occaſion afford an aliment. I ſhall not, however, take any particular notice of thoſe that require ſuch a preparation as he propoſes and deſcribes; becauſe I believe the farinaceous, or, as he calls it, the Amylaceous, matter extracted from thoſe roots, is exactly the ſame from whatever root it has been extracted, and the ſame that may be extracted from other ſubſtances with much leſs labour. I am here, therefore, to take notice only of thoſe roots commonly employed as food in this country in the ſtate in which nature preſents them to us, and hardly requiring any other preparation than the ordinary one of the kitchen.

SILIQUOSÆ.

The two firſt marked are taken from this order; in all of which, as already obſerved, there is found a peculiar acrimony.

The *Raphanus* or Radiſh, has commonly a large quantity of alimentary ſubſtance, in proportion to its cortical part, in which only the peculiar acrimony of the order is lodged. It may therefore be eaten, as it commonly is, in its recent ſtate, with the whole of its cortical part; and for which eſpecially it ſeems to be taken, as it may rather ſerve as a condiment to its aceſcent ſubſtance, and which therefore ſeldom proves flatulent. It does not, however, ſeem to be very nouriſhing.

The *Rapum* or Turnip affords a much larger quantity of mild pulp in proportion to its cortical part, in which only the peculiar acrimony of the order is lodged. As this cortical part can be entirely ſeparated without much trouble, it is very generally the pulp only that is admitted into our diet. It is a watery and tender ſubſtance, and therefore is eaſily digeſted, and occaſions little flatulency. It has ſome ſweetneſs; but it

it does not seem to contain much nourishment in proportion to its bulk. MARGRAAF could not extract any sugar from it; and BERGIUS observes that it affords very little amylaceous matter. It is of two kinds, distinguished by their colour of white and yellow. The latter we have become acquainted with in this country only of late. It is of a more sweet and mucilaginous taste, and therefore is seemingly more nutritious than the white. As it has also another property of being more hardy in sustaining the winter, it is likely to come into the most general use.

The botanists have given us two different species of roots under the titles of the Brassica Napus or *Navew*, and the Brassica Rapa or *Turnip*: and both the gardeners and farmers are very well acquainted with the distinction; the former being most cultivated in France, and the latter more commonly in England. With what advantages the one or other may be preferred, I cannot clearly determine; but to me they seem to differ only in the form of the root; and I can find no difference in their qualities to be taken notice of here. Both the kinds are much employed in feeding cattle; and as they are given to them with the cortical part, it is alleged that they are ready to communicate an odour and taste of a disagreeable kind both to the flesh and milk of cows; but this does not seem to be constantly the case: And I think it is worth observing, though foreign to this place, that the milk of cows is not always affected by turnip; and perhaps only when some portion of the decayed leaves of the plant are given along with the root.

UMBELLATÆ.

Daucus. This is a root of very frequent use; and though it does not readily yield a grained sugar, yet it yields a great deal of sweet or melliginous juice, which gives a strong mark of its nutritious quality. In this root there seems to be a quantity of mucilaginous matter which prevents it from yielding a grained sugar, but at the same time undoubtedly contributes to its being nutritious. Experiments on brute animals show the Carrot to be nourishing in a considerable degree; and it is certainly so to man, affording a tender and not very flatulent food. The effects of these roots in poultice, and of the seeds of the plant as a medicine, will be considered in another place.

Pastinaca

Paſtimaca or Parſnip. Experiments on brutes ſhow theſe roots to be conſiderably nouriſhing. They have a conſiderable ſweetneſs in their taſte; and they manifeſtly contain a great deal of mucilage; which though it prevents their yielding much of a grained ſugar, by no means detracts from their nutritious quality. A peculiar taſte which remains in them even after boiling, is diſagreeable to a great many perſons. Whether this peculiar taſte in the ſkirret and parſnip is accompanied with any diuretic quality, we will not poſitively determine; but we have not upon any occaſion perceived it.

Siſarum. The roots of this plant in their recent ſtate ſeem to be of a firm conſiſtence; but by boiling in water they are brought to be very tender. Mr. MARGRAAF found them to yield a large proportion of ſugar, and Mr. BERGIUS found them to afford a quantity of amylaceous matter; and on account of both they are conſiderably nouriſhing and not very flatulent: but on account of a peculiar taſte approaching to that of the parſnip, which remains in them even after boiling, they are not in ſuch general uſe as might be expected.

With reſpect to theſe roots, the obſervation of Mr. BERGIUS, that their ſaccharine part does not go along with the amylaceous when this is ſeparated, may deſerve notice, as it may lead to ſome inquiries and ſpeculations relative to the nutritious parts of vegetables.

SEMIFLOSCULOSÆ.

Of this order there are two alimentary roots, the *Scorzonera* and the *Tragopogon*, by the gardeners commonly called *Salſafi*. Theſe roots reſemble one another both in their alimentary and medicinal qualities as much as they do in their botanical characters. They are lacteſcent roots, but with a ſingular mildneſs in their juice which has a little ſweetneſs; but neither by that nor by any other ſenſible quality do they give marks of their being very nouriſhing. When boiled, they are ſufficiently tender, and do not prove very flatulent. Their medical virtues, if they have any, ſhall be taken notice of in another place. In the mean time, I muſt obſerve my being a little ſurpriſed at the otherwiſe judicious BERGIUS recommending the treatiſe of FEHR de Scorzonera, which appears to me to be a very frivolous work, and of no authority.

ALLIACEÆ.

ALLIACEÆ.

Of this tribe we have a ſet of roots of much more activity than thoſe laſt mentioned, and by that being of more importance as medicinal than as nutrimental.

Of theſe roots, the *Garlic*, *Roccambole*, and *Shallot*, we ſuppoſe to be employed as condiments rather than as aliments. They indeed truly contain alimentary matter; and when the Garlic in certain climates is produced with leſs acrimony than it is with us, it may perhaps properly enough make a part of diet.

Of this order they are the *Porrum* and *Cepa* that are moſt commonly employed as alimentary matters, and afford indeed a large proportion of it. This appears eſpecially in their boiled ſtate, in which their acrimony is exhaled, and they ſhew with ſome ſweetneſs a large proportion of mucilaginous matter. Even in their recent ſtate, and eſpecially when young, their acrimony is not ſo ſtrong as to prevent our vulgar from taking them as a conſiderable part of their food. By our better ſort of people, it is the onion only that is taken in its young and recent ſtate, but hardly in larger quantity than may be conſidered as a condiment. Deprived, however, of their acrimony by boiling or roaſting, they are uſed by all ranks more largely. It is, however, ſo difficult to deprive them entirely of all peculiar taſte, that I have known many perſons who, from a particular idioſyncraſy, cannot bear them even in a boiled ſtate.

The acrimony of the Alliaceæ is very nearly of the ſame nature with that of the Tetradynamia, and have therefore the ſame diuretic quality: but this, with reſpect to both orders, is to be conſidered in another place.

To the liſt of roots I have here added the *Batatas* or Potatoes, or the roots of the *Solanum Tuberoſum*, now become in almoſt every country of Europe, and eſpecially in our own, an important article of diet. I ſhall, however, conſider this root as entirely a farinaceous matter; and as it may be proper in the firſt place to conſider theſe farinaceous matters in general, I ſhall afterwards take up the conſideration of particulars, and among the reſt that of the Potatoes and others.

D. SEMINA,

D. SEMINA, *or the* SEEDS OF PLANTS.

These are in general and chiefly nutritious, as containing a farina or farinaceous matter; and as such they make the most considerable part of the aliment of men over almost the whole of the earth. This has led Dr. HALLER to introduce the term of *Farina Alibilis*, and to mark it as the chief part of our vegetable aliment. To avoid, however, the inaccurate idea that might arise from this, we have taken some pains above to show that farina, or that powdery substance which is found in nutritious seeds, is a compound matter, consisting chiefly of sugar and oil. These, indeed, are often so blended together into what may be called a neutral substance, that the properties distinguishing the two ingredients can hardly, or at least rarely, be perceived in the compound. Although it is not in our power to explain in what manner the vegetable œconomy forms the various compounds it produces, nor to account for the appearances these productions put on, yet we judge it to be shown above, that the compound we name Farina is truly such as we here suppose it; and that by marking the appearances or experiments which show more or less of the saccharine or oily matter in the several seeds, we may in some measure ascertain their several qualities. Upon this plan we now proceed to treat of particulars.

We refer the several farinacea to three different heads, under the titles of *Cerealia*, *Legumina*, and *Nuces Oleosæ*; which, though not quite exact, is sufficiently so with regard to the most part of them. By this assortment, we think they may be distinguished as they contain more or less of saccharine and oily matter, or as these are in proportion to one another. In the Cerealia, we suppose the sugar to be large in proportion to the oil; in the Legumina, the oil to be somewhat larger in proportion to the sugar; and in the Nuces Oleosæ, the proportion of the oil to be still greater. At the same time we believe it will be found, that in the several farinaceous seeds the nourishment they afford is in proportion to the oil they contain.

a. *Cerealia.* Under this title are commonly put the ſeeds of the ſeveral gramineous or culmiferous plants that are employed as the food of men. It is, we believe, juſtly ſuppoſed, that the ſeeds of the whole of this order contain a farinaceous matter of a ſimilar nature, and that our chooſing thoſe to be here enumerated is merely from the ſize of their product, which allows them to be more eaſily collected in conſiderable quantity, or perhaps from their being more eaſily cultivated in certain ſoils and climates. This in the main may be juſt; but there is ſome difference in the qualities of the Cerealia here enumerated, which we muſt now take notice of.

HORDEUM, BARLEY.

In the ſpecies of this there is ſome difference, according to the number of ſeeds in each row of the ears; and hence the Hordeum Diſtichum, Tetraſtichum, and Hexaſtichum: and this difference is attended with ſome difference in the ſize and plumpneſs of the grain, but with no difference of qualities that we can perceive.

We have obſerved above, that all the Cerealia by their germination have their ſaccharine matter evolved, and therefore more readily ſubjected to a vinous fermentation. This ſeems to take place more readily, perhaps more fully, in barley than in any other of the Cerealia; and therefore it is the grain from whence very univerſally our Beers and Ales are prepared. Whether barley actually contains a greater proportion of ſaccharine matter than the other Cerealia, or merely differs from them by that matter's being more readily evolved, we dare not determine; but from the circumſtance of its ready evolution, it appears probable, that the barley contains in its farina a ſmaller proportion of oil than ſome other grains, and upon that account is leſs nouriſhing than thoſe others. This is confirmed by the experience of our vulgar, who ſometimes live on barley and ſometimes upon oats. In ſome higher parts of this country where they raiſe much barley, and therefore live more upon it, it is common for them to purchaſe a quantity of peaſe to mix with their barley, in order to render their bread and other food more nouriſhing. The ſame is confirmed by experiments on brutes, who are not found to be nouriſhed equally by the ſame quantity of barley as of oats.

Barley

Barley is employed as a part of diet both in its unmalted and in its malted ſtate. In the former, however, almoſt only, it is employed as a common aliment; and I do not know that there is any experiment or obſervation which ſhows that barley in its unmalted ſtate is a more antiſeptic aliment than any other grain. Of late, however, we have learned, that in its malted ſtate, its ſaccharine matter extracted by infuſion in water, and given as a part of diet, proves remarkably antiſeptic. I have no doubt that it is to be imputed to its aceſcent quality as a ſaccharine matter. It is long ago ſince I pointed out ſugar as an alimentary matter, and as being fitted for obviating the putrefactive tendency of the animal fluids; and it was from this hint that Dr. MACBRIDE, as he himſelf informed me, firſt propoſed the employment of wort for preventing the ſcurvy. I am ſtill perſuaded that a plain ſugar may be employed for this purpoſe; but I ſhall hereafter obſerve, that ſugar cannot be employed alone in large quantity with the ſame ſafety as when it is accompanied with ſome farinaceous or oily matter, which renders it more ready and proper to enter into the compoſition of the animal fluid.

A decoction of barley, or as it is called barley-water, is a drink employed in many diſeaſes; and it is not unworthy the attention of the phyſician to direct the proper preparation of it. Accordingly the London and Edinburgh colleges have both given their directions for this purpoſe. The particular ſcope of their directions is, that as the decorticated, or as it is called pearl barley, is by long keeping liable to get a mealineſs upon its ſurface, which is ready to become muſty, the barley ſhould be, by repeated ablutions, well freed from the mealy part on its ſurface before it is ſubjected to decoction.

SECALE, RYE.

How this grain turns out in malting, I have not had an opportunity of learning, as the culture and employment of it is rare in this country; but as in the northern countries of the continent it is frequently employed for affording an ardent ſpirit, there can be no doubt of its containing a due portion of ſugar. By the large quantity of mucilage, three-fourths of its weight, that it affords by decoction in water, it may be preſumed to be ſufficiently nouriſhing. But its not affording any

milkineſs to water triturated with it, ſhows that its oil is under a peculiar combination; and if there be a due portion of oil in it, it is difficult to explain why this grain, of all the other Cerealia, ſhould be the moſt readily aceſcent. This indeed might ſeem to detract from its nouriſhing quality; but the experience of the northern countries of the continent ſufficiently eſtabliſh it. It is little employed as an aliment with us; and the people unaccuſtomed to it, upon occaſionally taking it, generally find it laxative; which is readily explained by its aceſcency.

With reſpect to the nature and effects of the Secale Cornutum, I muſt leave it to be determined by the ſtudy of many late writers upon the ſubject. Rye is ſo little cultivated in this country that I have had no proper opportunity of examining the matter myſelf, and can only ſay, that though there are ſeveral people of this country who take rye pretty conſtantly as a part of their diet, I have never known or heard of any peculiar diſeaſe ariſing among them.

MILIUM, MILLET.

This is ſo little uſed in this country, that I have had little opportunity of judging of its qualities. It has ſome ſweetneſs, but does not diſcover much aceſcency, and ſeems to be eaſily digeſted. That this or any other of the Cerealia binds the belly, I will not believe upon the authority of HIPPOCRATES himſelf.

ORYZA, RICE.

This is a grain which has long been the farinaceous aliment of the greateſt part of Aſia, and has now for a long time been employed as an aliment in Europe; but its peculiar qualities are not eaſily aſcertained. It has little ſweetneſs, is not readily aceſcent, nor readily ſubjected to fermentation. From theſe circumſtances, and as at the ſame time it is by the teſtimony of all Aſia ſufficiently nouriſhing, we would judge that its oil, though very intimately united with its ſaccharine part, is, however, in good proportion; and I would judge it to be more nouriſhing than any of the grains already mentioned. Upon what grounds SPIELMANN ſuppoſes it to be leſs nouriſhing than barley or rye I cannot perceive. Its nutritious matter is not attended with any noxious quality that I can diſcern; and therefore the notion that has ſometimes prevailed

prevailed in this country of its being hurtful to the eyes, ſeems to be without foundation. It has been ſuppoſed among phyſicians to be poſſeſſed of ſome drying or aſtringent quality, and has therefore been commonly employed in diarrhœa and dyſentery preferably to the other farinacea; but this opinion alſo I take to be groundleſs: for it does not give any mark of aſtringent quality with the vitriol of iron; and if it has ever been found uſeful in diarrhœa, it muſt, as SPIELMANN properly judges, be owing entirely to its demulcent power; which, however, is not ſtronger in it than in ſeveral others of the farinacea.

AVENA, OATS.

This is a farinaceous food uſed by many people in the northern parts of Europe: but it is eſpecially the food of the people of Scotland, and was formerly that of the northern parts of England; countries which have always produced as healthy and as vigorous a race of men as any other in Europe.

The meal of this grain diſcovers little ſweetneſs, and rather when a little toaſted gives what we call a kernel taſte, approaching to that of the nuces oleoſæ. In its ſound ſtate, it is entirely without any bitterneſs; which SPIELMANN and ſome writers have alleged to be in the bread made of it. It diſcovers no more aceſcency than the other farinacea; and when malted is readily ſubjected to fermentation, and affords an ale which, tho' ſeldom made very ſtrong, is very agreeable and without any bitterneſs. The nouriſhing quality of oats, both with reſpect to men and brutes, is in this country very well known; and I uſe the ſame reaſoning with reſpect to its ſaccharine and oily parts, as I did above with reſpect to Rice. With reſpect to it, phyſicians and the vulgar have fallen into contrary opinions; but both of them, as I judge, miſtaken. The former, eſpecially the French, ſpeak of it as refrigerant; but it is merely ſo as being a vegetable aliment not heating. The vulgar, and eſpecially the great vulgar of England, from its being ready to give ſome heartburn, or ſenſe of heat at ſtomach, have ſuppoſed it to be heating; and from a miſtake with regard to the ſtate of diſeaſes, have ſuppoſed it to give cutaneous affections, not more frequent in Scotland than in other countries; and which indeed ariſe from no particular aliment,

ment, but always from a contagion communicated from one perſon to another. With reſpect to the heat perceived at the ſtomach, it is owing to the aceſcency which oat bread, commonly unfermented, is liable to occaſion; and I have frequently found, that unfermented bread of wheat meal was equally liable to give the ſame heart-burn and ſenſe of heat at ſtomach. Where a decoction of oatmeal, or water-gruel, is in requeſt, I think it proper to mention here in what manner it may be rendered moſt agreeable. An ounce of oat-meal is ſufficient to make two quarts of water-gruel. This meal is to be put into three quarts of ſoft cold water, and ſet over the fire. The meal is to be conſtantly ſtirred among the water till it boils; and then it is to be allowed to boil till a third of the water is boiled away. The decoction is then to be poured through a linen cloth into a bowl a little larger than ſufficient to contain it. In this bowl it is to be left to cool; and when cooled it will be found to ſeparate into two parts, one of them a mealy cloud or ſediment, and the other a very thin and clear liquor. The latter is to be carefully decanted or poured off for uſe. To render this more agreeable, by the addition of ſugar, acids, or aromatics, or to impregnate it with medicinal ſubſtances, I leave to the judgment of the nurſe or of the phyſician.

ZEA, MAIZ.

This is entirely an American grain, affording a farina of the beſt quality, and largely nouriſhing both to men and brutes, as the experience of America has fully aſcertained. The ripe ſeeds are of a hard ſubſtance, but may be broke down into a very fine meal. This has little ſweetneſs, and no acidity that I can perceive. By itſelf, and even with yeſt, it does not ferment ſo well as to give a light bread; but added in pretty large proportion to wheat-meal, it may be made into a very perfect bread.

TRITICUM, WHEAT.

This is the farinaceous food moſt generally uſed by the better ſort of people over the whole of Europe, excepting the very northern parts in which it cannot be produced; but even there it is imported for the uſe of perſons of condition. It has this advantage, that it can be formed into a more perfect kind of bread than any other of the Cerealia

that

that we yet know of; and before going further, it ſeems proper to take this opportunity of ſaying ſomething of bread in general.

When food is taken into the mouth, it is often neceſſarily detained there, in order to be ſubjected to a proper manducation; and even when it is of ſo ſoft a kind as not to require that, it certainly conduces to digeſtion that ſuch food be detained in the mouth till it is divided into ſmall parts, and at the ſame time intimately mixed with the ſaliva. For this purpoſe of detaining food till it is ſubjected to a due manducation, it will be evident that no meaſure can be more proper than the taking in along with our different foods a quantity of dry, friable, and nearly inſipid matter. Such a matter is bread, in itſelf alſo nutritive: and we might ſay more with reſpect to the propriety of its uſe; but it is enough to remark in proof of its being particularly ſuited to the purpoſes of the human œconomy, that, very univerſally, mankind are impreſſed with an inſtinct to employ it. While the farinacea are diſtributed ſo univerſally over the face of the earth, and have become the chief objects of culture, they are very generally made into bread; and as generally a portion of them is taken into the mouth along with almoſt every morſel of other foods. That this is a general inſtinct, and ſuited to the purpoſe of the human œconomy, is well illuſtrated by this, that the Laplanders, in want of the vegetable farinacea, make a powder of fiſh-bones, and employ it made into a bread. This is the general idea of the purpoſe of bread, which is very univerſally made of vegetable farina. But as it would be inconvenient to employ this in its powdery ſtate, ſo it is brought into a coherent maſs by water, and this again is brought into a dry and friable ſtate by a proper application of heat, or what we call baking; and by all this rendered fitter to be divided and taken in ſeparate morſels.

Bread may be prepared of any of the farinaceous ſubſtances already mentioned; but in many caſes the bread ſo prepared is leſs dry and friable, leſs miſcible therefore with the ſaliva and with our other foods, and perhaps leſs wholeſome than might be deſired. Mankind, therefore, have ſtudied and found out a means of correcting theſe faults and imperfections of the bread made of meal and water alone; and

and this they have found to be by ſubjecting the paſte of meal and water to a certain degree of aceſcent fermentation before it is again dried or baked into a bread. Under this fermentation it is found, that the mealy paſte has a large quantity of air extricated, probably exhaled; but as a quantity of it remains ſtill diffuſed, the maſs is ſwelled into a larger bulk, and when the heat is applied, the bread formed is of a more ſpongy texture, more tender, friable, and more readily miſcible with the ſaliva and with our other foods.

Theſe qualities give the moſt perfect bread; but the moſt complete fermentation cannot be given with equal ſucceſs to every kind of farina. Moſt of the kinds hitherto mentioned made into a moiſt paſte, and kept in a warm place, will enter into ſome aceſcent fermentation, and this fermented portion added to another quantity of the ſame paſte, will communicate ſome fermentation to the whole, which when baken, will give a bread of a lighter kind than could have been formed of unfermented paſte. In ſome other caſes alſo, where the fermentation of the paſte alone does not ſucceed ſo well as might be deſired, it may be aſſiſted by an addition of yeſt, or lees of ale; but even this does not give with any of the farinacea, excepting wheat, a very perfect bread. It is therefore with wheat-meal only, without any foreign ferment, and by its ſpontaneous fermentation alone, that the moſt perfect bread can be obtained. That this is the peculiar property of wheat appears from hence, that even theſe farinacea which by themſelves cannot by any art be brought to afford a perfect bread, yet, by being joined with a certain proportion of wheat, may along with this be brought into the ſtate of perfect bread.

This peculiar property of wheat was obſerved very long ago; but the cauſe of it was not perceived, whilſt wheat ſeemed almoſt in every reſpect to poſſeſs only the qualities in common to moſt of the other farinacea. It was about the year 1728 that BECCARIA of Bologna diſcovered ſomething in the conſtitution of wheat very different from what he could diſcover in any other of the farinacea. This is a glutinous matter which remains after the amylaceous part is waſhed off, and which has the properties of animal ſubſtances, very different from the properties of the other part of the

the wheat, and from thoſe of any other vegetable farina yet known. This diſcovery has been ſince confirmed in every reſpect by many other philoſophers and chemiſts of Europe; and it is now publiſhed in ſo many writings, and ſo commonly known, that it does not ſeem neceſſary to enter into any further detail concerning it here. We have introduced the mention of it chiefly to ſay, that it is probably this part in the conſtitution of wheat that renders it fitter for a ſpontaneous fermentation, and by perhaps a peculiar mode of fermentation, to form wheat into a more perfect bread than can be made of any other farinaceous ſubſtance taken entirely by itſelf. That this is the effect of the glutinous part of wheat, appears very probable from hence, that by the addition of a portion of this glutinous part of wheat to other farinacea, they can be brought into a more perfect bread than they could by any means be brought to without ſuch addition.

We have thus explained the peculiar property of wheat in being fit to give a more perfect bread than any other farinaceous ſubſtance; but wherein it otherwiſe differs from theſe, we dare not determine. Since the diſcovery of BECCARIA, moſt phyſiologiſts, except Mr. PARMENTIER, have been of opinion, that, on account of its containing a matter approaching to the nature of animal ſubſtance, it ſhould afford to animals a greater quantity of nouriſhment than an equal weight of thoſe which do not contain any ſuch matter. This, however, is not quite certain: for though by the operations of BECCARIA, a glutinous matter cannot be ſeparated from the other farinacea in the ſame manner as from wheat, in which, even in the grain, it ſeems to lie ſeparate from the other ſubſtance of it; yet it may, notwithſtanding, be preſent in the other farinacea in a more diffuſed, and therefore more inſeparable ſtate. The coagulable nature of the other farinacea by heat, as a property belonging to animal ſubſtances, gives ſome preſumption of their containing ſomething of this kind; and it does not appear certain that wheat gives more nouriſhment to men, or other animals, than ſome others of the farinacea do. In ſhort, till experiments ſhall have determined this, we are diſpoſed to conclude, that the property of wheat, which has rendered

ed it so generally employed and preferred, is merely its superior fitness for affording a more perfect bread.

While we are upon this subject of bread, it seems very proper to enter upon the discussion of an opinion which in modern times has very much affected our reasonings concerning the qualities of the farinacea employed in diet. The discovery of the circulation of the blood naturally led physicians to consider obstruction as a principal cause of disease; and while they were ignorant of, or inattentive to, the other possible causes of obstruction, they were ready to suppose a certain state of the fluids to be the chief cause of it. This gave occasion to the Cartesians to introduce the doctrine of a lentor; and which, from the application of it we have now mentioned, has prevailed in our pathology ever since. We are not here to consider whether it be well or ill founded; and are only to take notice of a mistake which it has occasioned with respect to the use of farinaceous matters in diet. Dr. Boerhaave having given the *glutinosum pingue* as one of the simple diseases of the fluids, has assigned as the first cause of this, the use of the *farinosa non fermentata*: and his learned commentator has taken up the opinion, and repeated it, though not always with consistency, in many parts of his work. In entering upon the consideration of this, we are willing to own that a farinaceous substance formed by fermentation into a perfect bread, is the most wholesome condition in which farinaceous matters can be employed as a part of our food; and we are also ready to allow that the unfermented farinacea taken in immoderate quantity, especially at a certain period of life, or in dyspeptic stomachs, may be the cause of disease: but all this seems to have been exaggerated; for the morbid effects of unfermented farinacea are truly rare occurrences; and indeed the same unfermented farinacea are for the most part very well suited to the human œconomy.

However considerable the use of fermented bread may be, the use of unfermented farinacea is still very great and considerable amongst almost every people of the earth. The whole people of Asia live upon unfermented Rice; and I believe the Americans, before they became acquainted with the Europeans, employed, and for the most part still employ, their Maiz in the same condition. Even in Europe, the

the employment of unfermented bread, and of unfermented farinacea in other ſhapes, is ſtill very conſiderable; and we are ready to maintain, that the morbid conſequences of ſuch diet are very ſeldom to be obſerved. In Scotland, nine-tenths of the lower claſs of people, and that is the greater part of the whole, live upon unfermented bread, and unfermented farinacea in other forms; and at the ſame time I am of opinion, that there are not a more healthy people any where to be found. In the courſe of fifty years that I have practiſed phyſic amongſt them, I have had occaſion to know this; and have hardly met with a diſeaſe of any conſequence that I could impute to the uſe of unfermented farinacea.

Phyſicians who repreſent theſe as a noxious matter, muſt at the ſame time acknowledge, that in every country of Europe it is often uſed with perfect impunity. To obviate, however, the concluſion I would draw from this fact, they allege, that it is only ſafe when uſed by robuſt and labouring people; but we give it in this country, not only to the farmer's labouring ſervants, but to our ſedentary tradeſmen, to our women, and to our children; and all of the latter live and grow up in good health, except a very few dyſpeptics who are not free from complaints, which thoſe alſo are liable to who live on fermented wheaten bread. What may happen to children who from their birth are fed with pap inſtead of a mother's milk, I cannot determine, becauſe I have not had occaſion to obſerve ſuch a practice. In this country, our children have hardly any other food except their mother's milk for the firſt five months of their life; but after that period, or perhaps ſooner, oat-meal pottage, with cows milk, is gradually introduced as a part of their diet. After their being weaned they are put upon this very entirely: and the bad conſequences of it at either period I have never perceived.

From all theſe conſiderations, it will appear that a great deal too much has been ſaid of the noxious effects of unfermented farinacea. I have ſaid above, that it would ſurpriſe modern phyſicians to find that CELSUS (who like other ancients can hardly be in the wrong) ſhould ſay, that unfermented was more wholeſome than fermented bread. I am ready to allow that he was in the wrong; but I am diſpoſed

ed to ſuſpect that it happened from his obſerving that the lower people, who lived on the unfermented, were generally more healthy than thoſe of the better ſort, who lived upon fermented bread.

We have thus offered ſome reflections on the ſeveral Cerealia, ſtrictly ſo called, that are uſed in this country; and muſt now ſay a little of ſeveral farinaceous ſubſtances which are not of the tribe of Gramina, but very much of the ſame ferinaceous nature with theſe.

FAGOPYRUM, BUCK WHEAT.

This is ſo little uſed as an aliment in this country that I have hardly had any opportunity of ſtudying its effects; but from all appearances, it has the common quality of a farina. The common employment of it by the weaver ſhows its mucilaginous nature; and in feeding poultry it appears to be conſiderably nouriſhing.

SAGO, or SAGU.

This in our catalogue we have referred to the Cycas circinalis; but whether properly or not ſeems uncertain: and it is not neceſſary for us to determine the matter more exactly here, as we believe it is obtained from different trees, which, though ſomewhat different, afford one and the ſame kind of ſubſtance, ſuch as we have it imported under the name of Sago.

It comes to us in a granulated form of a farinaceous matter, which by being boiled in water is reſolved into an inſipid almoſt tranſparent jelly. Its gelatinous ſtate points it out as a nutrient matter; and we are aſſured that it is much employed as ſuch in the Eaſt Indies, and that in ſome parts of that country it makes a great part of the food of the inhabitants. The value which the Japaneſe put upon it appears ſtrongly from the account given of it by THUNBERG in his Flora Japonica, under the article of Cycas revoluta.

Drupæ comeduntur a Japonenſibus; medulla autem caudicis, ſupra modum nutriens, inprimis magni æſtimatur: aſſeverant enim, quod tempore belli fruſtulo parvo vitam diu protrahere poſſunt milites; ideoque ne commodo eodem fruatur

fruatur hoſtis extraneus, ſub capitis pœna vetitum eſt, Palmam e regno Japonico educere.

We have no experiments to determine the proportion of nouriſhment which it affords in Europe; but muſt think it conſiderable: and as a matter readily ſoluble, it is properly in this country given as an aliment to weakly perſons.

SALEP, or the ROOT OF THE ORCHIS MORIO.

The preparation of this root, by which it is brought into the ſtate of a farinaceous powder is now well known. As brought to us from Turkey, it is ſuppoſed to be formed from that ſpecies of the Orchis above ſet down; but from Mr. MOULT'S account in the Philoſophical Tranſactions, vol. lix. it may be formed from ſeveral other ſpecies of the ſame genus; and I have ſeen it prepared in this country from the Orchis bifolia, as pure and perfect as any that comes from Turkey. In either caſe it is an inſipid ſubſtance, of which a ſmall quantity by a proper management converts a large portion of water into a jelly. This gelatinous quality preſumes it to be nutrient; but we know of no experiments that have aſcertained the degree of its nutritious quality, and we judge it to have been greatly over-rated.

The demulcent qualities both of this and of the preceding article will be conſidered hereafter.

It is now proper for me to conſider another farinaceous root, as I promiſed to do after conſidering the other farinacea. This is the POTATO, or Roots of the *Solanum Tuberoſum*. This root, by a proper drying, is readily brought into a farinaceous powder that has every property of the Cerealia, except that it affords no gluten or animal matter, as wheat does. It affords a large proportion of an amylum, preciſely of the ſame nature with that of wheat, or of any other of the Cerealia. Its nutritious quality in general is now aſcertained by the experience of all Europe, as in almoſt every part of this it makes a conſiderable portion of the food of the vulgar. As, however, the Potato contains ſuch a conſiderable proportion of water, amounting to one half or more of their whole weight, they cannot be ſuppoſed to give, in proportion to their bulk, ſo much nouriſhment as the

the Cerealia do. In compenſation, however, of this, their watery texture renders them of eaſy ſolution and digeſtion in the ſtomach; and I think they are leſs liable to become aceſcent or to give heartburn than the unfermented Cerealia.

Whilſt the Potatoes are nouriſhing, as we have ſaid, they are without any noxious quality that I can perceive; and I am much ſurpriſed to find it has coſt Mr. PARMENTIER ſo much trouble to engage many of the philoſophers of his country to approve of the uſe of this root, while the vulgar, by the ſure guide of experience, are univerſally reconciled to it. To confirm this, I do not think it neceſſary to employ any other chemiſtry than what is mentioned above.

As the people of this country do not put ſo much value on fermented bread as thoſe of ſome other countries do, ſo we have hardly thought of making Potatoes into a fermented bread; but with the vulgar they frequently anſwer the general purpoſe of bread taken in their boiled ſtate, in which they are often found to be dry and mealy.

The other modes of cookery proper for introducing this root into diet, are now ſufficiently known; and whoever would inquire more curiouſly into this may conſult PARMENTIER and BERGIUS.

CASTANEA, the CHESNUT.

As theſe fruit afford no oil by expreſſion, I could not, as I had formerly done, inſert this article among the Nuces Oleoſæ, and have been a little uncertain where to place it; but I can find no place more proper for it than here, after the Cerealia and other farinaceous matters which reſemble theſe.

The Cheſnut has a good deal of ſweetneſs, which is more evolved by heat applied; and its ſaccharine nature is ſufficiently evident from the fermentable nature of its juice. Though it gives no oil by expreſſion, yet from the oil that is manifeſt in the fruit of the Fagus Sylvatica, it may be ſuppoſed to be in this alſo, although it happens to be more intimately united with the ſaccharine part. Both together form a farinaceous matter which can be made into bread, and treated

ed in every manner that the other farinacea can be. Its nutritious qualities are well known to the people in the ſouthern parts of Europe, amongſt many of whom it is often the chief and almoſt the whole of their food. It is ſaid to be of difficult ſolution and digeſtion; and from the firmneſs of its texture, this might be ſuſpected: but as ſaid above, this quality is more frequently ſuſpected to be hurtful than it ought to be.

b. *Legumina, Legumes or Pulſe.*

Theſe terms have not been accurately applied; but we would ſtrictly confine them to the fruits of the papilinaceous plants; to the capſule of which, of a determined ſtructure, the botaniſts have now affixed the term of Legumen.

In entering upon the ſubject, we cannot help beginning with an obſervation, which though ſeemingly not connected with our treatiſe of materia medica, is not altogether foreign to it. It is this, that the ſeeds of the legumina are a farinaceous ſubſtance, affording an alimentary matter, upon the ſame principles as the cerealia and farinacea in general do: and theſe two ſubſtances, the cerealia and legumina, make the greateſt part of the vegetable aliment employed by men. They are therefore very univerſally the objects of the farmers culture: and it is agreeable to obſerve how well theſe two orders of plants, the Culmiferæ and Papilionaceæ are particularly adapted to that purpoſe. Whilſt the culmiferæ raiſed upon the ſame ſoil for ſeveral years ſucceſſively exhauſt and render it barren, ſo that without reſt or manure, its fertility cannot be maintained; but if, inſtead of repeating upon the ſame ſoil the crops of the culmiferæ, theſe crops are alternated with crops of the papilionaceæ, the fertility of the ſoil may be preſerved without reſt or manure for many years together. This I know from experience; and it ſhows how well theſe two objects of the farmer's culture are adapted to his purpoſe; and that, while farinaceous matters in general are the alimentary ſubſtances required, nature has given them of two different kinds, to favour the cultivation of both. This obſervation, though of the utmoſt importance, is not always properly obſerved by the farmer; but it was very anciently perceived, and in general obſerved.

Hence

Hence VIRGIL:

Aut ibi flava seres mutato semine farra;
Unde prius lætum siliquâ quassante legumen,
Aut tenus fœtues viciæ, tristisque lupini
Sustuleris fragiles calamos, sylvamque sonantem.

The other ancient writers on husbandry always mention the leguminous crops as answering the purpose of manure; and the moderns have properly named them Meliorating Crops. The reason of all this might be given, but it is not proper in this place.

The seeds of the Legumina, when quite ripe and dry, are readily broke down into a fine powder, in its consistence resembling the farina of the cerealia, but of a more unctuous softness, and of a sweeter taste. When triturated with water, they give a more milky solution than the cerealia; and when the entire seeds are treated by expression, with a considerable heat applied, they give manifestly an oily exsudation. In their germination they show a considerable quantity of a saccharine matter evolved; and in this state their solution is readily enough subjected to a vinous fermentation. Their resembling the cerealia is further evinced by their affording, in consequence of a proper treatment, a considerable quantity of amylum. All these considerations show that the Legumina contain a saccharine matter equal to that of the cerealia, and at the same time a greater proportion of oil; which explains sufficiently why the former are more nourishing than the latter. This is confirmed by daily experience in brutes; and its being the same in men I am assured from this observation: On certain farms of this country, upon which the Legumina are produced in great abundance, the labouring servants are much fed upon that kind of grain; but if such servants are removed to a farm upon which the Legumina are not in such plenty, and therefore they are fed with the cerealia, they soon find a decay of strength; and it is common for servants in making such removals to insist on their being provided daily or weekly with a certain quantity of the leguminous meal.

It is perhaps owing to the leguminous seeds being of a more oily quality, that they are not of so easy solution as the cerealia, and are therefore suited to the more robust people. They

They have alſo another quality which very much affects the digeſtion of them. By the experiments of BOYLE and HALES, it appears that they contain a large quantity of air in a fixed ſtate, which during their digeſtion in the ſtomach is extricated in greater quantity than can be again abſorbed: and upon that account theſe legumina have been at all times noted for occaſioning flatulency, and ſometimes colic pains.

It is to be remarked, that the legumina are uſed in two different ſtates: one is, when they are young, and therefore of a tender texture, eaſily digeſted, and giving leſs flatulency, but at the ſame time giving leſs nouriſhment: the other ſtate is, when they are ripe; in which ſtate they are more nouriſhing, but with the qualities of being difficultly digeſted, and of occaſioning flatulency, as we have ſaid. Their qualities in the various intermediate ſtates may be judged of as they approach more or leſs to the one or other extreme.

After ſaying thus much of the Legumina in general, I need ſay little about the particulars.

PISUM, PEASE.

FABA, the BEAN.

The difference of theſe, with reſpect to the general qualities mentioned above, is very inconſiderable. The peaſe, though perhaps leſs nutrient and leſs flatulent than the bean, are generally more tender; and therefore it is that the peaſe, in their full grown ſtate, are more frequently, and almoſt only, upon our tables. With reſpect to their young ſtate, the ſame difference may appear; but I believe it is for the following reaſon, that the peaſe can be more conveniently employed in a younger ſtate than the bean. The huſk of young peaſe is a tender and ſoluble ſubſtance, and is never ſeparated from the fleſhy part of the pea; whereas the huſk of the bean is not ſuch a ſoluble matter, and is therefore commonly and very properly ſeparated from the body of the bean, eſpecially when this is in any thing of an advanced ſtate.

With reſpect to both theſe Legumina in their young ſtate, there is a conſiderable variety of them both for the purpoſe of the gardener and of the table; but the difference of their qualities for the latter purpoſe is not conſiderable, and may

be eaſily aſcertained by the circumſtances to be perceived in the taſte of them, as they are ſweeter or more mucilaginous.

PHASEOLI, KIDNEY-BEAN.

Theſe in their ripe ſtate cannot be eaſily produced in this climate, and therefore ſeldom appear upon our tables. They are ſaid, and ſeem to me, to be leſs nutrient and leſs flatulent than the peaſe and beans. The Phaſeolus in this country is only employed in the young and green ſtate of their Legumina; and ſome ſpecies of peaſe may be employed in the ſame manner. In both caſes, the ſubſtance when well boiled is of the oleraceous kind: but though ſweeter and more nutrient than theſe, is ſtill tender and eaſily digeſted.

c. *Nuces Oleoſæ.*

Theſe are farinaceous ſeeds, which have a large proportion of oil in their compoſition. We have ſaid above, that oil is always a part in the compoſition of farina; but in many inſtances it is ſo intimately united with the ſaccharine part, that its diſtinguiſhing qualities do not appear. Here, however, it does appear, or at leaſt it is very readily by expreſſion or heat ſeparated in its proper form.

In what manner it before exiſted in the ſeed, is not very clear. The common opinion is, that even in the ſeed it exiſted in a ſeparate ſtate, lodged in certain cells ſeparate from the reſt of the ſubſtance: but this is not certain; for the eye, even aſſiſted with the microſcope, does not diſcover ſuch cells; and in certain ſeeds treated by infuſion, the whole of their ſubſtance is extracted in the form of a mucilage, in which no oil appears ſeparated. The oil here, therefore, in this mucilage, is united with the other parts of the ſubſtance, and may have been ſo while it exiſted in the entire ſeed. How indeed, in that caſe, it can be ſeparated by expreſſion, is not eaſily explained; but from the conſiderations juſt now offered, it muſt ſomehow be done without leading us to ſuppoſe the ſeparate exiſtence of it in the ſeed.

This ſubject is touched as a piece of chemiſtry relative to ſome queſtions that have before occurred; but it is not neceſſary to inſiſt farther upon it now: for whether the oil of the Nuces Oleoſæ exiſts in a farinaceous or in an oily ſtate, it will equally anſwer our purpoſe in proving, that theſe kernels are conſiderably

conſiderably nutritious; and that bulk for bulk, or weight for weight, they are more ſo than any of the farinacea hitherto mentioned. They are accordingly employed in diet; and in ſome inſtances as a conſiderable part of it. This indeed happens in a few inſtances only, and chiefly when they are taken in their young and unripe ſtate: for it appears that as they proceed in their growth, it is their ſaccharine and ſtrictly farinaceous matter that is firſt produced with a ſmaller proportion of oil; and that by the further maturation of the ſeed, the quantity and proportion of the oil is conſtantly increaſing to the utmoſt it can arrive at. It is thus we may explain the large uſe that is made of the cocoa-nut or chocolate in the torrid zone.

In other caſes, where the oil of theſe kernels is in large proportion to the other ſubſtance, I doubt if they can be employed as food in large quantity, and by themſelves, for that purpoſe. Whatever may be the power of our gaſtric fluid, I believe it does not operate upon any vegetable ſubſtance, unleſs this ſubſtance is at the ſame time ſubjected to ſome degree of fermentation; but oily matters ſeem to reſiſt this, and are therefore of difficult digeſtion, lie long in the ſtomach, and often feel uneaſy there. It is true, that oil itſelf is digeſted; but it probably is by a mixture with acids previouſly provided in the ſtomach, and when at the ſame time both the oil and acid are in a fluid ſtate. In the caſe of the oily farinacea, it ſeems to be the ſolution that gives the difficulty; and I have known many inſtances of parts of theſe kernels being brought up from the ſtomach by a rumination, long after they had been taken down.

Enough is now ſaid with regard to the nature of the oily farinacea in general; and the particulars do not give occaſion for much to be ſaid.

The AVELLANA, the AMYGDALÆ DULCES, and the JUGLANS, do each of them contain a large, and much the ſame, proportion, of a mild oil, and are therefore very much of the ſame nature and qualities, whether as food or medicine. It is only to be remarked, that as we ſaid before that theſe oily kernels are in different ſtates in the progreſs of their maturation, ſo they will alſo differ according to their climate, giving more or leſs of that maturity. Thus the Filberts or

hazel-nuts of this climate do not contain the same quantity of oil which they do in more southern regions.

These three oily nuts mentioned have each of them a cuticle inclosing their farinaceous and oily matter. This, in the two first, is a powdery astringent substance: and when the kernels are eaten with the cuticle upon them, this adheres to the fauces for a long time after, and excites coughing; which, however, does not at all happen from eating the decorticated seeds.

The PISTACHIO does not contain such a quantity of oil as the others mentioned; and how they turn out in nourishment I have not learned.

One of the most considerable of the oily farinacea, is the CACAO or Chocolate, which yet remains to be spoken of. How it may differ in its farinaceous part from that matter in the other seeds, I cannot perceive: but it seems to be very intimately blended with the oily part, as it exists in the nut or kernel; and it seems also particularly fit for being united by triture with that oil when it has been anywise before separated. With this farina the oil seems to be in as large proportion as in any other of the oily farinacea; and this oil, while it is equally bland as in any of the others, has this superior quality, that it is much less liable than any of them to become rancid.

From these circumstances it will appear, that Chocolate must be equally nutritious with any other such substance, and perhaps less offensive to the stomach. This substance, however, is not always easily digested, and has sometimes given all the inconveniences in digestion that have happened from the others; but it appears that these inconveniences may be in a great measure obviated by a very diligent triture, uniting very intimately the farinaceous and oily part. This seems to be attempted in every preparation of Chocolate for food: but it seems to be nowhere executed so perfectly as at London; where, instead of the levigation formerly practised, it is made to pass between two cylinders rolled against one another. The Chocolate thus prepared can be very equally diffused, and almost dissolved, in water or milk, and that without showing any particles of oil floating separately on the surface;

ſurface; which, however, happens to every other preparation of it that I have ſeen. It is at the ſame time to be remarked, that Chocolate is always more eaſily digeſted, as its oily and farinaceous parts are, by its preparation, more intimately united together.

To the liſt of the *Nuces Oleoſæ* ſhould have been added the *Semina Papaveris Albi*, or White Poppy Seeds, which, with a portion of farinaceous, contain a large quantity of oily matter, which may be copiouſly obtained from them by expreſſion. This has preciſely the ſame qualities as the other expreſſed oils, and has been employed both in diet and medicine as the others have been. It is hardly neceſſary now-a-days to ſay that theſe ſeeds have not in the ſlighteſt degree any part of the narcotic quality which prevails ſo conſiderably in the capſules, or as they are called the Poppy-heads, from which they are taken. Theſe ſeeds have been employed in diet in conſiderable quantities, without diſcovering the ſmalleſt degree of a narcotic quality, or any other than thoſe of the Nuces Oleoſæ we have already treated of.

To the ſame liſt of oily ſeeds might have been added the ſeeds of the cucurbitaceous fruits, commonly known under the title of the greater Cold Seeds. All theſe, with a portion of farinaceous matter, contain a quantity of oil, and which gives them a title to be mentioned in this place. They have accordingly been formerly much employed along with almonds in preparing emulſions. There is no impropriety in their employment; but at the ſame time they have no different qualities from thoſe of the almond, and have certainly no peculiar refrigerant powers to recommend their uſe. They are therefore now properly omitted in both the Edinburgh and London Diſpenſatories.

The oily part of theſe oily farinacea ſeparated by itſelf, is much of the ſame nature in all the different ſpecies, and is much of the nature of the Olive-oil, which is next to be ſpoken of; and which, as an oil, is more employed in food than all the reſt.

OIL OF OLIVES.

Much might be ſaid of this as a medicine; but I am here confined to ſpeak of it as a nutriment only: and if we conſider

ſider how much oily matter is neceſſary to the animal ſyſtem, it will readily appear why ſo much of oily matter is taken in diet. Beſides the quantity of oily matter that is almoſt always joined and intermixed with our animal food, there is even a part of that, and a very great part of our vegetable aliments, that in our cookery are almoſt conſtantly accompanied with oil in one ſhape or other; and there are hardly any people known that do not make uſe of oil in its ſeparate ſtate, and who have not made ſome proviſion for this purpoſe. This proviſion is indeed drawn from different ſources in different countries; but it ſeems to be very nearly of the ſame nature in all of them: that is, it is a mild and bland oil, with little odour or taſte, and very nearly the ſame as it is found in many vegetables, and in the bodies of almoſt all animals. At leaſt theſe oils, when brought to the ſame degree of purity, are, except in point of conſiſtence, very nearly the ſame. There will be no difficulty, therefore, in admitting that the unctuous and mild oils of vegetables are ſuited to ſupply the human body, either as it grows requiring nouriſhment, or as upon occaſion of waſte it may require repair.

As the oil of the human body is collected for the purpoſes of the œconomy in conſiderable quantities in particular parts of the body, ſo it may be, and has been, imagined, that the oil taken into the body is merely to afford or ſupply the oil of the adipoſe membrane; and that, as taken in, it continues unchanged both as it paſſes through the firſt paſſages, and even as diffuſed in the blood-veſſels it continues there unmixed till it exſudes through pores in the veſſels into the cellular texture. We have endeavoured, however, to give another view of this matter, and to ſhow, that the oil taken into the ſtomach is at length truly mixed with the proper animal fluid, and makes a conſiderable part in the compoſition of it. And agreeable to the other parts of the theory on that ſubject, it ſeems proper to remark, that oil and oily matters are, from ſpontaneous inſtinct as it would ſeem, taken in eſpecially with aceſcent ſubſtances, that is, with the moſt part of vegetables.

Which of the oils employed in diet are beſt ſuited to the purpoſe, we cannot diſtinctly perceive; and believe they are all equally proper, if they are equally free from other adherent matters, and from rancidity in themſelves.

Whilſt

Whilſt the moſt part of men willingly receive, and digeſt eaſily, a conſiderable portion of oily matters, there are certain perſons whoſe ſtomachs digeſt them with very great difficulty, or not at all. I have known ſeveral who, in the courſe of a long life, conſtantly felt uneaſy from taking in any oily matter, and therefore avoided them very entirely; ſo that I have known a woman of fourſcore years who had hardly ever taſted butter. I have alſo known ſeveral perſons who, at certain periods of their lives, could not find that oily matters, though taken down without averſion, were truly miſcible with the other fluids of the ſtomach, but were ready to be thrown up by eructation in the ſame oily ſtate they had been taken down in, and pretty entirely ſeparated from the matters which they had been very intimately mixed with in diet.

There is alſo this conſiderable difference in uſing oily matters, that ſome perſons can take, and readily enough digeſt, a portion of theſe, though they have contracted a good deal of empyreuma, and though they have acquired a good deal of rancidity; while many other perſons, though they can take oily matters very freely, are, however, very ready to find them indigeſtible, if tainted with any degree of empyreuma or rancidity.

I thought it proper to mark theſe differences in the digeſtion of oils; but how they may be explained or accounted for I cannot find. We have of late had the exiſtence of a gaſtric menſtruum very well aſcertained; but the cauſes of its different operation in different animals, and in different men, are by no means yet explained. Upon the ſuppoſition of this menſtruum, and of its ſolving powers in general, I have endeavoured to aſſign the qualities of ſeveral different aliments; but the many differences of theſe which appear in different men, I do not pretend almoſt in any meaſure to account for.

With reſpect to the different digeſtion of oils juſt now mentioned, I will add an obſervation, which, though it does not relieve any of our difficulties, is a matter of fact, and therefore to be marked. In ſeveral of the perſons who could not find oils readily miſcible with the other fluids of the ſtomach, I have found at the ſame time that their

ſtomachs

ſtomachs abounded with acid to an uncommon degree. What effect this may have, or if it may have any at all, upon the doctrine I have maintained above, that acid is a chief means of uniting oil with the other parts of the animal fluid, I leave my ſpeculating readers to determine.

After the other vegetable aliments, I have ſet down the chief ſpecies of the *Eſculent Fungi*; and as this country does not afford any variety of theſe, I have not experience enough to mark any different qualities that may appear in the ſeveral kinds: but what I have to ſay in general with regard to them deſerves attention. If they are truly vegetable matters, which ſome have doubted of, they are truly different from every other vegetable that we are acquainted with: for in the firſt part of their diſtillation, without addition, they give out no acid, but a large proportion of volatile alkali; and expoſed ſo as to undergo a ſpontaneous fermentation, they ſhow no aceſcency, but become immediately putrid. By theſe two circumſtances, aſcertained by our own experiments, they ſhow a very near reſemblance to the nature of animal ſubſtances; and from thence their qualities are to be judged of. They ſeem nowiſe ſuited, as vegetable ſubſtances ſo univerſally are, to be joined with animal ſubſtances, with a view to obviate and moderate the tendency of the latter to putrefaction; and we alſo preſume that they are more conſiderably nutritious than almoſt any truly vegetable ſubſtances are.

SECT.

SECT. II.

Of ALIMENTS *taken from the* ANIMAL KINGDOM.

THESE are somewhat different, as they are taken from one or other of the six classes of Mammalia, Aves, Pisces, Amphibia, Insecta, and Vermes; into which naturalists have now agreed to divide the whole subjects of the animal kingdom: and I shall now therefore consider the animal aliments as they are taken severally from these classes.

§ I. *Of* ALIMENTS *taken from the Class of* MAMMALIA.

Of this class there are two orders, the *Primates* and *Cete*, which we shall not take any further notice of as alimentary: for though even the first among certain people may be such, and more certainly the latter is frequently such among many; yet as these are hardly used among civilized people, as we are almost entirely unacquainted with the use of them, and have no information with respect to them that can be depended upon, we shall take no further notice of them in this treatise.

Here we shall confine ourselves to the consideration of the aliments taken from those other orders of the Mammalia which by naturalists were formerly comprehended under the title of Quadrupedia.

Of many of these quadrupedia we use the milk which the females of certain orders afford, as a frequent part of our aliment: and as this is commonly and justly held to be of an intermediate nature between the entirely vegetable and entirely animal aliments; so it seems proper in passing here from

from the conſideration of the one kind to that of the other, to give ſome attention, in the firſt place, to this intermediate or mixed kind of aliment.

ARTICLE I. *Of Milk.*

We ſhould perhaps begin this ſubject with explaining the manner and occaſion of the production of milk in the female ſex; but we reſerve that till we ſhall have conſidered the nature of this fluid, as it may be aſcertained by obſervation and experiment.

In doing this, we muſt limit ourſelves to the conſideration of thoſe milks only which are uſed as aliment in this country: for although in other countries other milks are uſed, we have not ſufficient information to enable us to ſpeak diſtinctly concerning them. The milks, therefore, to be here conſidered are thoſe of *Women*, or of the domeſtic animals, *Aſſes*, *Mares*, *Cows*, *Goats*, and *Sheep*.

Theſe milks ſeem to have properties much in common with one another, in as far as they conſiſt of parts which are nearly of the ſame nature in each; and the difference of milks ſeems to depend chiefly upon the proportion of theſe parts to the whole, and of the ſeveral parts to one another. It will therefore be allowable, and even proper, to begin with the conſideration of milk in general.

Milk, as it iſſues or is drawn from the veſſels of the female that affords it, appears to be a homogeneous liquor; but after it has remained for ſome time at reſt in the open air, it diſcovers itſelf to conſiſt of different parts or ſubſtances, into which it ſpontaneouſly ſeparates, and which are conſtantly found to be an *oily*, a *coagulable*, and a *watery matter*; or as they are vulgarly known under the names of Cream, Curd, and Whey. We are here to conſider theſe parts in the order we have now mentioned them.

The ordinary circumſtances of this ſeparation, ſo commonly occurring under our eyes, need not be deſcribed here; but as it may be conſiderably varied by the circumſtances in which the milk is expoſed or kept, as well as by various artifices

artifices that may be applied to it, we ſhall, in conſidering the ſeveral parts, take notice of the ſeveral circumſtances and artifices affecting the ſeparation of them, and of the differences thence ariſing in the parts when ſeparated.

We begin with the conſideration of the oily part of milk, which is commonly the firſt that is ſpontaneouſly ſeparated. When milk is drawn from the female animal that affords it, if no coagulating power is applied to it, and it is allowed to remain at reſt for ſome time, it has a part ſpontaneouſly ſeparated, which floats upon the ſurface of the whole, appears of a thicker conſiſtence than what remains below, and is manifeſtly of an oily or unctuous nature. This is commonly known under the name of Cream: And though the ſeparation of it will take place in cloſe veſſels, it takes place more quickly and completely if the ſurface of the milk be expoſed to the air; and in larger quantity if it be expoſed by a large ſurface, over which a gentle ſtream of air is conſtantly paſſing. The influence of the contact of air appears further from this, that as the cream firſt formed interpoſes a denſe layer between the air and the body of the milk, more cream can be obtained from a given quantity of milk, if as ſoon as a layer of cream is formed it be taken off from the ſurface, and thereby a new ſurface be freely expoſed to the air.

It ſeems alſo to be a meaſure for expeding and increaſing the ſeparation of the oily part, if the milk ſoon after it is drawn from the animal, be made to boil over the fire. By this a great quantity of air is detached from it; and the intumeſcence of the milk, which always appears upon this occaſion, ſhows that the whole body of the milk is in every part of it greatly agitated. The theory of this effect of boiling is not very evident; but it ſeems to depend upon this, that the oily parts of milk are very minutely diffuſed among the other parts of it, and connected with them by the attraction of adheſion: but as the attraction of the oily parts towards one another ſhould be ſtill greater than towards the other parts of the milk, it is perhaps only neceſſary by ſome agitation of the whole to bring the oily parts in contact with one other, in order to unite them together, and thereby make them ſeparate themſelves more readily and copiouſly. I expect this will be found to be the theory of the manœuvre by

by which butter is commonly procured from cream, as will be mentioned hereafter.

The ſeparation of cream is much affected by the ſtate of the milk in its progreſs towards the other ſeparations that are to take place. As after ſome time milk becomes acid, and not long after is coagulated into one maſs; ſo, as the aceſcency proceeds, the ſeparation of the cream is in ſome meaſure interrupted, and upon the coagulation taking place it ceaſes altogether. It is therefore that as the aceſcency and coagulation are haſtened in warm, and retarded in cold, weather; ſo, according to the ſtate of the weather, the production of cream is greater or leſs. As thunder, and a certain diſpoſition in the air to produce that meteor, is found to haſten the aceſcency and coagulation of milk; ſo this explains the effects of thunder, and of a certain ſtate of the air upon the ſeparation of cream.

The proportion of the oily part in milk depends upon different circumſtances in the ſtate of the animal affording it. There is undoubtedly in certain females a peculiar conſtitution diſpoſing them to give a greater proportion of oil in their milk than other animals of the ſame ſpecies do, though both the one and the other be preciſely in the ſame circumſtances. What this depends upon is not clearly perceived. It may, and certainly in ſome meaſure does, depend upon the peculiar conſtitution of the animal: but it appears moſt frequently in animals bred in particular places, as the Iſle of Alderney, the climate and ſoil of which I do not exactly know; but we are certain that it is conſtant in animals bred and reared in mountainous countries, ſuch as the mountains of Swiſſerland and the Highlands of Scotland.

The conſtitution, however, of animals being given, various other circumſtances give a different proportion of the oil in their milk. It is commonly greater as the age of the animal is more advanced, or as the animal is longer after its delivery: and eſpecially it is greater as the ſoil of the paſture ground is drier, or as it has been for more years in paſture; and, on the contrary, as the ſoil is moiſter, and as the herbage is more ſucculent, the proportion of oil is diminiſhed.

The

The proportion of the oily part of milk being thus aſcertained, we have next to obſerve, that as it is at firſt ſeparated in the form of cream, this, beſides the proper oily part, always contains a certain quantity of both the coagulable and watery parts of the milk. From theſe the oil is to be ſeparated by an agitation which we call Churning; and by which it is obtained in the form of what we call Butter. The theory of this operation we have hinted above; and as the proceſs ſucceeds without the eſcape of air, or other mark of any fermentation, and ſucceeds under the admixtures of various ſubſtances, it is probable that it depends upon the agitation alone operating in the manner we have ſaid: And the theory of it ſeems to be confirmed by its explaining at the ſame time the effects of boiling, which in the Devonſhire practice allows butter to be procured from cream with much leſs agitation than is in other caſes neceſſary.

As we have now conſidered the means by which the oily part of milk is obtained very much in its ſeparate ſtate, it is time to conſider its nature and peculiar qualities.

This oil, in its recent ſtate, is very much of the nature of the expreſſed and unctuous oils of vegetables and that of animal fats, both in its ſenſible qualities and as examined by a chemical analyſis. Butter is more conſiſtent than the moſt part of vegetable oils, owing we ſuppoſe to a mucilaginous matter adhering, which ſeems alſo to adhere to thoſe oils; but here probably the mucilaginous or caſeous part of milk adheres more firmly, on account of the acid of milk alſo adhering. Butter, like the other mild and fat oils, is liable to a change which we call Rancidity, in which it acquires a peculiar odour and taſte, very commonly known, and as quite *ſui generis* not to be deſcribed. Wherein ſuch a change conſiſts is not yet well explained. It ſeems to depend upon a change, not in the proper oil, but in ſome of the matters adhering to it: for butter not well freed from butter-milk more readily becomes rancid than that which is more entirely ſeparated from it; and butter by being melted and freed from a depoſit which it makes on being kept in a melted ſtate for ſome time, may be thereby longer preſerved from rancidity; and in that caſe alſo it becomes of a more

more fluid conſiſtence: all which I think implies, that it is now a more pure oil than it was before.

What is the nature of the matter which may be thus ſeparated from butter, and is the proper ſubject of rancidity, it is difficult to determine: but that it is in part an acid, I judge from the rancidity's being promoted by the adherence of butter-milk; and from hence alſo, that rancid butter readily corrodes copper, which it did not in its recent ſtate. Along with this acid there is manifeſtly alſo a mucilaginous matter; and it ſeems to me, that in both theſe matters together a fermentation takes place, and gives the rancidity in queſtion. This peculiar fermentation, however, is ſtill little underſtood; and till it is better known, we cannot find what is very much to be deſired, the means of obviating the rancidity of butter, and of other fat oils. In the mean time, the only means we know of that may be employed for butter, is the ſeparating its acid and mucilaginous parts, by the application of ſea-ſalt. If we employ a very perfect ſalt of this kind, we need to employ only a ſmall quantity of it; and if at the ſame time we aſſiſt its antizymic power, by adding a ſmall proportion of nitre and ſugar, we may thus preſerve butter very long in a condition fit to be uſed as an aliment.

After the oily, I am now to conſider the Coagulable part of milk. In a few days after milk has been taken from the animal that affords it, the cream is in that time ſeparated from it, and the remainder is ſpontaneouſly coagulated into a ſoft but ſomewhat conſiſtent maſs, comprehending the watery parts of the milk, which are always at the ſame time in an acid ſtate; and indeed this acid ſtate almoſt always precedes the coagulation of the whole.

In ſome time after the coagulation is formed, the watery part ſeparates from the properly coagulated, ſo that this may be collected more entirely by itſelf; and in that ſtate it is frequently uſed in diet; but it is never collected, or attempted to be brought, into a ſolid form, ſo as to get the appellation of Cheeſe. The ſpontaneous coagulum of cream is ſometimes employed to give a ſpecies of cheeſe: but every other ſpecies of cheeſe is made by an artificial coagulation; that is, by the addition of a coagulating matter, either to entire

entire milk immediately after it is drawn from the animal affording it, or to milk after the cream has been ſeparated from it, but before the ſpontaneous coagulation had come on. The coagulating matter employed for this purpoſe is named *Runnet*; and it is commonly produced by filling the fourth ſtomach of a calf with milk, which is there coagulated; and the ſtomach, with this coagulum included, is preſerved for uſe in ſalt and water. The ordinary management and employment of this I need not take notice of; but it is very proper to obſerve, that the ordinary preparation of it has given occaſion to a ſuppoſition that the coagulating power of it depended upon the acidity that was found in the ſtomach of the calf, and communicated to the milk that was poured into it: but Dr. YOUNG's experiments ſhow clearly that the coagulating power of runnet does not depend upon that acidity, but is a quality reſiding in the ſubſtance of the ſtomach itſelf, as well as in the ſtomach of many other animals, and in many other ſubſtances the moſt remote from any ſuſpicion of adhering acidity.

Theſe experiments indeed leave us much at a loſs in judging upon what the coagulating power of runnet, and of many other ſubſtances which may be employed as ſuch, do really depend; and the whole of this buſineſs muſt be left uncertain till more experiments ſhall be made. In the mean time, it is enough to our purpoſe to obſerve, that the cheeſe which is uſed as an aliment is always made by the uſe of the ordinary runnet; and therefore that nothing diſtinguiſhes the qualities of the cheeſe made, but the kind and qualities of the milk of which it is prepared, and the various circumſtances and practices which take place in the preparation of it. But before entering upon the conſideration of the ſeveral ſpecies of cheeſe, I muſt ſay ſomething of the nature of cheeſe in general.

A quality belonging to every ſpecies of cheeſe is, that it is liable to putrefaction; and by this it may be ſaid that it approaches to the nature of animal ſubſtances. This opinion is confirmed by the matter of which cheeſe is formed, being, like animal ſubſtances, coagulated by acids, alcohol, and heat. It is true that the two latter, and even the mineral acids, do not act upon the cogulable part of milk in the ſame circumſtances and in the ſame manner as they do upon the ſerum of

of animal blood; but ſtill they do act upon milk in a manner that ſhows a great ſimilarity of the two ſubjects. The animal nature of cheeſe is eſpecially confirmed by its yielding in diſtillation a volatile alkali. This indeed is a diſputed fact; but I aſſume it upon the authority of eminent chemiſts, and upon actual experiment made under my own eye. A pound of ſkimmed-milk cheeſe, not in the leaſt affected by putrefaction, yielded in diſtillation, firſt, a very pure water, very ſlightly acid; ſecondly, a liquor which effervesced ſtrongly with the mineral acids; and, thirdly, there came over an alkaline ſalt, concreting every where on the inſide of the receiver; and, in the laſt place, an empyreumatic oil.

Upon the whole, therefore, I conclude, that cheeſe, or the coagulable part of milk, is very much of the nature of animal ſubſtances; and if we ſhall adopt the common opinion, that milk is eſpecially formed of the chyle or newly taken-in aliment, we ſhall readily perceive that this muſt be always blended with the lymph which it meets with in its paſſage through the lacteals and thoracic duct; and we ſhall then alſo admit that this lymph makes a part, and particularly the coagulable part, of milk. We judge, therefore, that milk is properly ſuppoſed to contain a portion of animal matter; and at the ſame time, that the milk of animals feeding wholly, or for a great part, on vegetables, may be juſtly ſuppoſed to be an aliment of an intermediate kind between vegetable and animal.

This is our doctrine with reſpect to cheeſe in general; but it is now to be remarked, that cheeſe as employed in diet is of very different kinds. We have ſaid already, that cheeſe is hardly ever made of the ſubſtance formed by the ſpontaneous coagulation of milk, and at leaſt only in the caſe mentioned above. In all other caſes, cheeſe is formed of curd produced by the application of runnet; and the cheeſe thus produced is diſtinguiſhed in the firſt place by the condition of the milk it is made of. Thus the runnet may be applied to entire milk as it is drawn from the animal affording it; or it may be applied to that milk after it has been previouſly deprived of its cream; or it may be applied to the cream ſeparated from the watery parts of the milk; or it may be applied to a portion of entire milk, to which is added

ed a quantity of cream taken from another portion of the ſame milk: from which eſpecially a conſiderable difference of cheeſe may ariſe from the different proportion of the coagulable and oily parts in the milk employed. Laſtly, the milk employed may be that of one animal only; or it may be a mixture in different proportions of the ſeveral milks employed in our diet, but eſpecially thoſe of cows, goats, and ſheep, the only milks from which cheeſe is prepared in this country.

Beſides theſe differences of cheeſe ariſing from the ſtate and quality of the milk employed, there are many other differences ariſing from the various practices employed in preparing it; as by the different circumſtances of the coagulation; by the management of the coagulum or curd; by the preſſure given to it; by the ſalting and drying; and by the manner in which it is afterwards preſerved. Theſe conſiderations will ſhow the very great variety of cheeſe as it is preſented upon our tables: but I am not able to explain all the cauſes of this variety; and it does not appear neceſſary to attempt it, as they relate more to œconomy and taſte than to our preſent purpoſe of conſidering it as an alimentary matter.

This we ſhall conſider after we ſhall have treated of all the ſeveral parts of milk; and at preſent ſhall touch only upon a curious queſtion with reſpect to the variety of cheeſe.

Cheeſes are commonly diſtinguiſhed by the different diſtricts of the country producing them, and in many of which they are often of a peculiar kind. From what has been already ſaid, it will readily appear that the practices of different countries may differ very conſiderably, ſo as to give a different ſtate of the cheeſe produced: and for the ſake of the particular qualities they may poſſeſs, or at leaſt for the purpoſe of accommodating them to particular taſtes, it might be deſired that the practices of different countries ſhould be aſcertained, ſo that they might be occaſionally imitated. This, however, is extremely difficult; and the reaſon of it ſeems to be, that when in any manufacture the circumſtances of the materials, and the practices employed in working upon them, may be greatly varied, it muſt be almoſt im-

poſſible for any two perſons who have not often operated together, to take exactly the ſame meaſures in every ſtep of a long proceſs.

Having thus ſuggeſted what ſeemed to be proper at preſent concerning the caſeous part, it remains now to conſider the third ingredient in the compoſition of milk; that is, the watery part, or, as it is commonly called, the Whey.

A pure elementary water is always a very conſiderable part of milk, as appears when we conſider it according as it is either ſpontaneouſly or artificially ſeparated from the other parts of the milk, or when after it is ſeparated we examine it by evaporation, applying ſuch a gentle heat as can hardly volatilize any other matter but the pure water. In ſuch caſes, both from HOFFMAN's and from YOUNG's experiments, it appears that the water is at leaſt ſeven-eighths of the whole milk.

From hence it may be obſerved, that milk is always to be conſidered as a very liquid aliment; but it is at the ſame time to be remarked, that this is not equally applicable to the different kinds of milk: for although the proportion of oily and coagulable parts be conſiderably different in different milks, yet the proportion of the watery part is not ſo much varied. The reſiduum of four ounces, after evaporation, of cows and womens milk is very nearly the ſame; as in the former it is three drams and thirty-two grains, in the latter three drams and thirty-four grains.

The watery part ſeparated from the other parts of milk is different according to the ſtate of the milk from which it has been ſeparated: but under whatever circumſtances ſeparated, this watery part is always found to hold diſſolved in it a quantity of matter which is different in kind, and different in proportion, according to the ſtate of the milk at the time of the ſeparation of the watery part.

When the watery part is taken from new milk coagulated by runnet, and when we eſpecially name it Whey, it always contains diffuſed in it a conſiderable quantity of the oily and caſeous parts, which by certain practices can be again ſeparated

rated from it. When whey is ſeparated from ſkimmed milk, or that which has been previouſly deprived of its cream, it ſtill contains a quantity of the caſeous part, but leſs of the oily. When the watery part of milk is ſeparated from the oily by churning, we name it Butter-milk; and it then contains a large proportion of the caſeous part, with very little of the oily. Laſtly, the watery part may be ſeparated either from entire or from ſkimmed milk, in conſequence of ſpontaneous coagulation; and in this ſtate it is always acid, and at the ſame time is the moſt entirely freed from both the oily and the caſeous parts. In theſe different ſtates, the qualities of the watery parts of milk as an aliment ſhall be taken notice of hereafter.

Having thus mentioned the different ſtates in which we obtain the watery part of milk, we now return to conſider it in that ſtate in which we moſt commonly employ it, that is, as it is obtained from entire milk, in conſequence of its coagulation by runnet. In this ſtate it is different according as the milk is taken from different animals, and not always in proportion to the contents of the ſeveral milks in their entire ſtate. Thus, as cows milk ſeems to contain a larger proportion of oil than that of goats, it might be ſuppoſed that the whey of cows milk ſhould contain more oil than that of goats milk: but the contrary appears to me to be the caſe; and it ſeems to depend upon this, that the oil of goats milk does not ſo readily ſeparate itſelf from the watery parts as it does from that of cows, but remains more tenaciouſly adhering to it, and therefore to be more copiouſly ſeparated with the whey.

Beſides the oily and caſeous parts which we have mentioned to be always contained in whey, it contains alſo a ſaccharine matter, which may be ſeparated from it by various proceſſes practiſed either on the milk or on the whey, and now very commonly known. The matter obtained by theſe proceſſes is a genuine ſugar, and differs from that of the ſugar-cane only by its having ſome of the oily or caſeous parts of milk adhering to it, but from which it may, by repeated ſolutions and cryſtallizations, be entirely freed, and thereby be brought to the ſame degree of purity as any other ſugar.

Whey, as containing this ſugar, is capable of avinous fermentation, and conſequently of affording by diſtillation an ardent ſpirit.

It is by the preſence of the ſame ſugar that whey ſo readily enters into an aceſcent fermentation, and becomes acid in the ſeveral circumſtances mentioned above. It appears that this acid, by being kept for ſome time, becomes more conſiderably acid, and probably an acid of a peculiar kind; though, ſo far as I yet know, it has not been chemically examined.

Having now conſidered the ſeveral parts of which milk in general conſiſts, it will be proper, in the next place, to inquire in what proportion theſe parts are to be found in the ſeveral milks employed in the diet of men in this country.

Theſe milks are thoſe of ewes, goats, cows, mares, women, and aſſes; the three former being thoſe of ruminating, the three latter of non-ruminant, animals: a diſtinction which I mark, though I cannot explain in what manner the circumſtances of ruminating or not ruminating affects the ſtate of the milk.

To mark in theſe milks the proportion of the ſeveral parts, I follow the experiments of Dr. YOUNG; and, according to him, the proportion of the caſeous part is in the order I have juſt now given them, greateſt in the firſt and leſs in the following, and that in the order above ſtated. It is evidently conſiderably greater in the ruminant than in the non-ruminant animals. In the former it may be pretty exactly aſcertained; but in the latter with much more difficulty: And it appears to me that many more experiments than have yet been made are neceſſary to aſcertain the circumſtances which affect their coagulation, and conſequently the proportion of their caſeous parts.

The proportion of ſerous parts, as might be expected is mentioned by Dr. YOUNG to be inverſely that of the caſeous part in the order above mentioned, as will appear from his Table, page 59. But it might be ſuppoſed alſo that the ſerous parts ſhould be in the ſame proportion as the watery parts found by evaporation: but we doubt if the experiments on this

this ſubject be ſufficiently exact; for there is ſome difference in the account Dr. YOUNG gives of the reſiduum after evaporation of the ſeveral milks, at the end of Sect. 3. of Chap. viii. from the particular experiments given in the former part of his work.

The proportion of the oily part is greateſt in the milk of ewes, next in the milk of cows, and leſs in that of goats; but I judge it difficult to determine this, as the oily part of goats milk does not ſo readily ſeparate itſelf as in that of cows from the other parts. In the non-ruminant, womens milk ſeems to contain more oil than the milk of mares or aſſes: but this does not ſeem to depend ſo much upon the difference of conſtitution as upon the difference of diet; for women commonly take in more of oily matter than mares or aſſes do: and I know from experiment that the proportion of oily matter is much diminiſhed by their being confined ſtrictly to a vegetable diet.

We have thus ſtated the proportions of the ſeveral parts of milk in the ſeveral kinds of it, nearly as it has been aſcertained by experiments already made; and the proportions here aſſigned, may, I truſt, be aſſumed in any reaſonings we may enter into upon this ſubject: but before quitting the ſubject we muſt obſerve, that in comparing the milk or milks of two different animals, the experiments already made cannot be of the utmoſt exactneſs; for as the milk of every individual is varied by peculiarity of conſtitution, by the age of the animal, by the diſtance of time from delivery, and by the difference of diet; ſo in comparing the milk of two different ſpecies, unleſs the two individuals are taken exactly in the ſame condition with reſpect to the circumſtances juſt now mentioned, the reſult cannot afford any general rule with reſpect to the two ſpecies. I give an example: Ewes milk, though it commonly affords more cream and butter than that of cows, yet I believe there may be found an Alderney cow whoſe milk will give more cream and butter than that of any ewe.

The ſame conſideration will perhaps account for ſome difference that is to be met with in the experiments of Dr. FERRIS from thoſe of Dr. YOUNG, with reſpect to mares and womens milk: and it is to be remarked, that womens milk

milk is more varied by the ſtate of diet than that of any other animal whoſe milk we employ; and particularly, that this renders the rank which womens milk holds in the tables of YOUNG and FERRIS to be a little uncertain.

Having thus conſidered milk in general, and alſo in the ſeveral kinds of it, we may now proceed to conſider in what manner this liquor is produced in the female ſex. The queſtion might firſt be, How it happens to appear for the firſt time in a certain circumſtance of the female body, that is, immediately after the production and delivery of their offſpring? But we chooſe to delay this queſtion till we ſhall have firſt conſidered in what manner it is produced during the whole of the time that the female continues to afford it.

The common opinion on this ſubject is taken from the ſeeming reſemblance of the milk to the chyle, into which our aliments taken into the ſtomach and inteſtines are always converted before they paſs into the blood-veſſels; and from this reſemblance it has been ſuppoſed that the chyle, without being mixed with the other parts of the blood, is directly carried to the mammæ of females, and appears there in the form of milk.

This doctrine, however common, we cannot admit of; and think it is founded upon, and has in its turn produced, ſeveral errors in phyſiology. In the firſt place, we cannot admit that the chyle, after paſſing into the blood-veſſels, remains for any length of time unmixed with the other parts of the blood; and in the obſervations which aſſert its having been found ſoon after the taking in of aliment appearing in a ſeparate ſtate, I judge there has been much miſtake, and that ſome other appearances of the blood have been miſtaken for chyle, as we know to have happened in many inſtances: or if it be poſſible that in certain caſes the appearance of chyle has been real, it is certainly not the ordinary courſe of the animal œconomy; for there have been innumerable inſtances of blood drawn from the veins at various intervals after the time of taking in of aliment, without its exhibiting any ſuch appearance. It is indeed almoſt impoſſible that it ſhould take place. The chyle does not paſs into the ſubclavian vein but in a great length of time; and therefore in a ſmall quantity only at once, and is therefore immediately blended

blended with a large proportion of blood. This diffusion increases as the whole is carried to the right ventricle of the heart; and in this, as well as in the subsequent passage through the lungs and left ventricle of the heart, the whole is acted upon by powers which must blend and diffuse the chyle in the most minute and intimate manner amongst the parts of a highly-coloured fluid. This must render it almost impossible, that in any part of the arteries or veins the chyle should afterwards appear united in one mass, and of its own proper colour, unless it could be shown that upon the stagnation of the blood, there was a power disposing the chyle to separate itself from the other parts of the blood, which is not alleged; nor could it possibly have existed without showing an appearance of chyle in many instances of extravasation, when, however, it certainly does not.

The supposition, therefore, that milk is especially afforded by the chyle in the same condition as it is received from the thoracic duct into the blood-vessels passing to the mammæ of females, and there giving the same matter and qualities we perceive in milk, is very ill supported by the notion of the chyle's remaining separate from the other parts of the blood for some time after it has been taken into the blood-vessels. How much soever of the aliments recently taken in we may find going to the production of milk, we shall find it very improbable that chyle takes that course in the same form and in the same crude state in which it enters the blood-vessels; and we shall find it much more probable that milk is produced in the mammæ of females by the peculiar, though mysterious, powers of secretion.

But although milk be not the same fluid which passed from the thoracic duct into the subclavian vein, there are many arguments which lead us to suppose that the matter of milk is chiefly afforded by the matter of the chyle, or of the alimentary matter last taken in. These arguments, however, are commonly employed very incorrectly, and carried too far. One argument employed upon this subject is, that the peculiar odour of the aliments last taken in often appears in the milk which is soon after secreted: and this, although it is in several instances true, is by no means universally so: for I have known many instances of nurses taking in a quantity of odorous matter without its appearing in their milk; and

and even if the appearance more univerſally took place, I cannot hold it as a proof of any conſiderable portion of the aliments taking that courſe. Certain odours are wonderfully diffuſible, and often appear when no great quantity of the matter affording them is preſent in the ſame place: And we might here employ the ſame reaſoning as we did before with reſpect to aſparagus in the urine; and therefore argue, that the odour of aliments being perceived in the milk ſecreted ſoon after, affords no proof that much of the matter of the aliment had taken that courſe.

But it is alleged further, that other qualities often appear in milk, which ſhow that a great portion of the particular matter of the aliments had contributed to the production of that fluid. This may perhaps in ſome inſtances be well founded; but I ſuſpect that the facts alleged to this purpoſe have been much exaggerated. It has been, for example, alleged, that purgatives given to a nurſe have affected her ſuckling; but Dr. YOUNG, although intent upon the inquiry, never found this to be ſo: and I am certain that in fifty inſtances that I have known the child was not affected by purgatives given to its nurſe; and though in ſome inſtances it ſhould have been ſo, conſidering the ſubtle and ſmall portion of matter in which the power of purgatives often reſides, I would ſtill think it a weak proof that a great part of the aliment conſtantly took that courſe. That the particular qualities of aliments do not always affect the milk ſecreted after their being taken in I know from this, that many nurſes take in conſiderable quantities of intoxicating liquor, and are themſelves intoxicated by it; but I have not known any inſtance of the intoxicating power being communicated to their ſuckling.

One of the ſtrongeſt arguments for proving that the aliment lately taken in contributes eſpecially to the production of milk, ſeems to be, that the quantity of milk ſecreted is always conſiderably and immediately increaſed upon the taking in of aliment; and that if aliment at any time has not been duly taken in, the ſecretion of milk is evidently diminiſhed. All this is true; but it appears eſpecially with reſpect to the liquidity of the aliment: and that a quantity of liquid taken into the body ſhould increaſe every ſecretion will be readily underſtood; and particularly that it ſhould increaſe

creaſe the ſecretion of milk, which conſiſts of ſuch a large proportion of water, is ſufficiently obvious. Every body knows that the enabling a nurſe to afford a large quantity of milk, depends much more upon her taking in a large quantity of drink rather than of ſolid food. How much the ſecretion of milk depends upon the ſupply of liquid, I have learned from a particular phenomenon. I have known nurſes who have been for the time quite free from thirſt, but upon a child's being put to their breaſt, and beginning to ſuck, they were immediately affected with a conſiderable degree of thirſt. This I would conſider as an inſtitution of nature, ſhowing the ſupply of drink to be eſpecially neceſſary to the ſupply of milk. Upon the whole, therefore, I cannot find the increaſe of the ſecretion of milk by the taking in of aliment to be any proof that much of the ſolid matter of the aliments, or any entire portion of the chyle, goes immediately to afford that ſecretion.

I have thus endeavoured to correct the miſtaken notion of the chyle, ſuch as it was received into the blood-veſſels, affording immediately and very entirely the matter of milk. But although I have rejected ſome, and endeavoured to weaken others of the arguments employed upon this ſubject, I do not mean to reject entirely ſome of theſe arguments from our conſideration. After all I have ſaid, milk, beſides water, contains a portion of other matter; and we muſt ſay from whence this is drawn. The oily and coagulable parts may be drawn by ſecretion from the maſs of blood in almoſt any ſtate of this; but beſides theſe parts, there is a ſaccharine matter which very rarely appears in any part of the maſs of blood, and may with confidence be preſumed to be afforded by the ſaccharine matter of our vegetable aliments, while they remain for ſome time unaſſimilated to the proper animal fluid.

I own there may be a fallacy in this reaſoning, as the diſeaſe of diabetes has ſhown that the powers of the animal œconomy can either produce or extract from our aliments a larger proportion of ſugar than uſual, and alſo preſerve it longer in an unaſſimilated ſtate: ſo we do not well know what effect this power may have upon the ſecretion of milk, till we ſhall meet with what has not yet occurred that I know of; that is, a woman in milk affected with diabetes.

Laying

Laying aſide, however, this ſpeculation, thrown in here as ſomewhat curious by the way, I go on to ſay, it is ſufficiently probable that the ſaccharine matter of milk is taken from the ſaccharine matter of vegetables, as it has recently been taken in, and yet remaining in an unaſſimilating ſtate: for we every day obſerve that the quantity of milk in the breaſts of women is increaſed by the taking in of vegetable aliments. That the taking in of vegetable aliment is abſolutely neceſſary to produce ſuch an aceſcent milk as we commonly find in the breaſts of women, we learn very clearly from Dr. YOUNG's experiments upon bitches. A bitch fed with vegetable aliments alone, afforded a milk aceſcent and ſpontaneouſly coagulating, like that of the ruminating animals; whereas the ſame bitch for a little time fed entirely with animal food, afforded a milk manifeſtly alkaline, and not ſpontaneouſly coagulating. The application of this in practice we ſhall conſider hereafter; but for the preſent it is enough to obſerve, that theſe experiments plainly ſhow that in animals, ſuch as women, uſing a promiſcuous diet, the ſtate of the milk produced will be very much more aceſcent or alkaleſcent according to the general character of the diet; but in animals uſing a vegetable diet alone, I can hardly conceive any other difference to ariſe than that of a greater or leſſer quantity; and we do not imagine that any ſubſtances purely medicinal can in that reſpect have any effect.

The organs of ſecretion in animal bodies are curiouſly adapted to one ſpecific ſecretion; and ſo much to that alone, as hardly to admit of any other matter ſuitable to that, to paſs through the organs of it. There are indeed inſtances of theſe organs tranſmitting matters which ſhould not make a part of their proper ſecretion; but theſe exceptions are ſo much fewer than might be expected, that they only ſerve to confirm the general rule. We have juſt now ſeveral inſtances of the breaſts of women rejecting matters not ſuitable to form milk, ſufficient to ſhow that the common ſuppoſition of the ready paſſage of ſuch matters to the mammæ muſt be ill-founded. The goat is a multivorous animal, and ſome vague notions have been formed of the qualities of its milk and whey from this variety of its food; but I can ſay from much experience, that a difference in the ſtate of its milk is very rarely to be obſerved: and upon the whole we would allege, that the projects of GALEN and HOFFMAN for impregnating

pregnating the milk of cows or aſſes with medicinal ſubſtances, are improbable and frivolous attempts towards refinement.

The general qualities of milk, and the different ſtates of it which may take place in the ſeveral ſpecies of animals, or even in the ſame individual at different times, being now conſidered, we proceed to what is eſpecially our buſineſs here, to treat of the uſe of milk as an alimentary matter.

In entering upon this ſubject, what firſt preſents itſelf is the uſe of milk as the proper nouriſhment of the new born animals of the claſs of mammalia. In what manner it is adapted to the whole of theſe, I dare not attempt to explain; and muſt confine myſelf to the conſideration of the new-born offspring of thoſe animals which afford the milks employed in the diet of this country, and very much to the conſideration of what relates more eſpecially to the human ſpecies.

The firſt production of milk being always at the ſame time with the production of the offspring, and with this of the organ affording milk provided with teats, or parts ſuited for ſucking, and the new born animal being inſtinctively directed to, and inſtructed in, ſucking, leaves no doubt that the milk produced is particularly intended for, and adapted to, the nouriſhment of the new-born offspring; and we are now to attempt explaining more particularly how it is adapted to that purpoſe in the human ſpecies.

On this ſubject the phyſiologiſts have ſatisfied themſelves very eaſily, in ſaying, that as chyle affords milk, ſo milk affords chyle without the aſſiſtance of the digeſtive organs, which, as they have not been before exerciſed in it, may not be immediately prepared for their function. But as we have ſhown that the former poſition is not true, ſo we judge the latter to be no better founded. It ſeems probable that milk does not enter the lacteals in the ſame ſtate in which it had entered into the ſtomach: for it appears that milk taken into the ſtomach is by a runnet applied to it always coagulated there, and therefore needs the ſolvent power of the gaſtric fluid to bring it again into a fluid ſtate: and it appears alſo probable, that milk becomes more or leſs acid in the ſtomach; and therefore that a certain combination with animal fluids is neceſſary

neceſſary to put it into that condition which chyle is always in when it enters the lacteals. Milk, therefore, taken into the ſtomach does not by itſelf become chyle; nor is it by its being already prepared chyle that it is fitted for the nouriſhment of new-born children. We muſt, therefore, ſeek for another anſwer to our queſtion; and there ſeems to be one very obvious, though not hitherto taken notice of by the phyſiologiſts.

Whilſt the fœtus or beginning animal remains in the womb of the mother, the whole of its fluids are the ſame with thoſe in the veſſels of the womb from which they are drawn, and are therefore as fully in an alkaleſcent ſtate as the human œconomy admits of; but we know alſo, that even in adults this ſtate of the blood, unleſs it were obviated by the excretion of the more alkaleſcent parts, and by the taking in of freſh and leſs alkaleſcent aliment, would ſoon paſs into a vitiated and dangerous ſtate. But the blood of a new-born child is in the condition diſpoſed to ſuch a change; and it is therefore neceſſary to give it a ſupply of aliment, and of aliment not quite alkaleſcent. Vegetable aliment in this view might ſeem ſuited to the purpoſe; but it is probable that an aliment of this kind would neither be ſuited to the powers of digeſtion nor immediately accommodated to the ſtate of the infant veſſels, adapted hitherto to a fully alkaleſcent blood. An intermediate nouriſhment, therefore, that may introduce the change by degrees, ſeems to be neceſſary; and ſuch an intermediate aliment is milk.

We do not diſcern with any preciſion the different ſtates of the alkaleſcency in the blood of different animals; but we preſume that it is more conſiderably alkaleſcent in the entirely carnivorous animals than it is in the human ſpecies, living partly on animal and partly on vegetable aliment. A certain lower degree than of the moſt alkaleſcent ſtate of the blood ſeems to be ſuited to the functions of the human œconomy; and from hence it is that man is inſtinctively directed to the uſe of vegetable aliments.

For purpoſes, however, which we cannot clearly explain, the veſſels of the fœtus are firſt filled with as fully alkaleſcent blood as it is in thoſe of an adult: but to bring the blood into, and preſerve it in, that ſtate which is beſt ſuited to the functions

tions of the human œconomy, it was neceſſary to introduce a vegetable aliment into the infant; and accordingly we find, that even for the firſt years of life health is beſt provided for by a large proportion of vegetable food. So conſiderable a change, however, could not be ſafely made in an infant but by degrees; and therefore for ſome months of infancy ſuch a mixed aliment as that of milk was the moſt proper. All this is confirmed by our experience of the inconveniencies that have attended all the attempts to introduce very early the large uſe of entirely vegetable aliment.

We have thus endeavoured to explain why milk is eſpecially ſuited to the nouriſhment of new-born children; and hardly any body has ever doubted of it, but the ſo frequently whimſical VAN HELMONT. Of late Mr. BROUZET has beſtowed an attention on this opinion of VAN HELMONT which appears to me to be equally frivolous and ill founded.

While milk is judged to be the proper nouriſhment of new-born animals, there can hardly be a doubt, that to every new-born animal the milk beſt adapted to it muſt be that of the ſpecies it belongs to, and conſequently that of the mother who had immediately produced it.

The reaſonings on this ſubject employed by Mr. BROUZET appear to me very unſatisfactory, and often erroneous; but as his opinions have not, ſo far as I know, prevailed among the learned, it does not ſeem requiſite to beſtow here the time and pains that might be neceſſary to correct them.

How long this nouriſhment is the beſt adapted to infants, it is difficult to determine; but the very purpoſe of multiplying the ſpecies ſhows that nature has ſet ſome limits to it. So far as we can truſt our obſervations on the human ſpecies, we find inconveniencies from either too ſhort or too long nurſing: and it appears to me that either leſs than ſeven, or more than eleven, months, is generally hurtful; ſo that the ordinary practice of nine months ſeems to be well founded. From ſome accidental circumſtances this meaſure may be ſafely varied; but what are the circumſtances of the infant's conſtitution that require it to be varied more or leſs, has not, that I know of, been properly aſcertained. The making it ſomewhat longer than the uſual term is the ſafeſt; but

but I am perſuaded that long nurſing contributes to increaſe the diſpoſition to rickets; and wherever children are ſlow in their teething, it ſeems improper to protract their nurſing.

Having thus determined as well as we can the length of time that is moſt proper to employ the mother's milk, another queſtion ariſes, How long it is proper to employ that alone, or how ſoon it is proper to employ an aliment of another kind? It has been already obſerved, that the very early introduction of vegetable aliment is improper: and we are perſuaded that it cannot be introduced with ſafety for ſome months after the birth; but for how long preciſely we dare not determine. From my own obſervation, I am led to think that hardly in any caſe it ſhould be introduced till five months are paſt; and even after that period, that it ſhould be increaſed by degrees only to the time of weaning, ſo that at this laſt period no conſiderable change may be made.

Further, it relates to this ſubject to obſerve, that in ſome infants even the mother's milk is not properly digeſted; and particularly, that it becomes more acid than it ſhould, and thereby produces diſorder in the infant. How this is to be obviated or cured, it would be very deſirable to ſay; but I do not find myſelf enabled to do it very clearly. It is not indeed always eaſy to perceive what is the cauſe of the diſorder, whether it be the ſtate of the nurſe's milk, the ſtate of other nouriſhment given at the ſame time, or the ſtate of the child's ſtomach.

With reſpect to the firſt, it might be perhaps ſuſpected that a too aceſcent diet given to the nurſe might be to blame; but I have not perceived this; and I have obſerved the diſeaſe to happen as often to the ſucklings of nurſes who took a good deal of animal food, as to thoſe of nurſes who lived more entirely upon vegetable aliment: and I have known that when the diſeaſe was attempted to be cured by giving the nurſe a larger proportion of animal food than uſual, this has not anſwered the purpoſe.

With reſpect to the ſecond cauſe, I am perſuaded it is ſometimes to blame; as I have obſerved that in ſeveral inſtances the diſeaſe happened to children who had been ſoon put

put upon the uſe of vegetable aliment; which produced an acid different from that of milk, and more difficult to be obviated or corrected by the digeſtive powers of the infant.

With reſpect to the third cauſe, as I have obſerved the digeſtive powers of ſome infants capable of overcoming the faults both of milk and other aliments, ſo I have no doubt that in others the weakneſs of theſe powers is often the cauſe of the diſorder we are treating of: but when even this is the caſe, I find it difficult to diſcern that the fault is in the digeſtive organs alone; and can only ſuppoſe it when other marks of debility in the whole ſyſtem are to be perceived. One mark of weak organs of digeſtion may, I think, be coagulated milk paſſing with the child's ſtools.

From this uncertainty with reſpect to the cauſes, it muſt be difficult to ſay in general how the diſeaſe is to be cured; and it muſt be left to ſkilful practitioners to judge of the cauſes in particular caſes, and to direct their practice accordingly.

Upon the ſubject of the chief uſe of human milk, it remains only to ſay what may be moſt proper to put nurſes in the beſt condition to afford milk in the greateſt plenty, and of the moſt proper quality. To this purpoſe I need not ſay, that if a nurſe is choſen of a ſound conſtitution, whatever in general is proper to preſerve health is the chief, perhaps all, that is neceſſary to make her a good nurſe. What are the meaſures in general proper for this purpoſe, it is not requiſite to ſay; and the only particular that we are engaged to conſider here is, that after having ſaid ſo much of the connection between the diet employed and the milk produced, that we ſhould determine as well as we can what is the moſt proper diet for nurſes.

To aſcertain this, we may obſerve, that the milks employed by the human ſpecies are all taken from animals living very entirely upon vegetable aliment; and therefore that a milk produced from that is ſufficiently well ſuited to the human œconomy: but that it is the beſt ſuited to it may be doubted from hence, that the milk deſtined to new-born children is the milk of women, who are capable of employing, and do commonly employ, a mixed diet of animal and vegetable matter; from which it might be inferred, that a milk afforded by

by such a diet was the best suited to the human œconomy even in the infant state.

If, however, it be considered, that womens milk contains as much vegetable matter as any other, and that nature has appointed it to be employed at the time when the chief purpose seems to be the introducing a vegetable matter, the use of a diet allowable, and perhaps necessary, at other times, does not afford an argument for its being proper upon this occasion.

I might say a great deal to show that the human œconomy, except in few instances, does not absolutely demand the use of animal food; that in fewer instances still does it demand it in large proportion; and that for the most part the health of the human body is best preserved by a large proportion of vegetable food. So from all this I think it will readily follow, that the health of women during the time of their nursing may be safely sustained by the use of vegetable aliments alone.

From the employment, therefore, of animal food by the human species, there arises no argument for the necessity or propriety of a woman's taking animal food during the time of her nursing. I allege it to be a matter of experience, that supposing the quantity of liquid to be the same, nurses living entirely, or for the greater part, upon vegetable aliment, afford a greater quantity of milk, and of more proper quality, than nurses living upon much animal food. This I venture to assert from the observations of fifty years; during which time, I have known innumerable instances of the healthiest children reared upon the milk of nurses living entirely upon vegetable aliments; and I have known many instances of children becoming diseased by their being fed by the milk of nurses who had changed their diet from entirely vegetable to the taking in a quantity of animal food. Nay, I have known instances of childrens becoming disordered from a nurse's making a single meal of an unusually large proportion of animal food.

If it be the purpose of nature, as it seems to be, to give infants milk of an acescent kind in pretty large quantity, Dr. YOUNG's experiments on bitches serve well to show how necessary

ceſſary a vegetable aliment is for that purpoſe; for theſe experiments inform us, that by feeding a bitch upon animal food alone, not only the quality of it was greatly changed, but the quantity of it alſo diminiſhed.

To theſe arguments in favour of the employment of vegetable aliment by nurſes, an objection might be made from what has been ſaid above of the morbid acidity that ſometimes occurs in the ſtomach of infants, and which may ſometimes be imputed to an unuſual aceſcency in the nurſes milk, ariſing perhaps from the aceſcency of their diet. The poſſibility of ſuch a caſe ſhall not be denied; but we are perſuaded it is a very rare occurrence. Indeed ſuch is the power of the animal œconomy to change the quality of aceſcents to an alkaleſcent ſtate, that I believe the exceſs of aceſcent aliment, or even of acidity produced from them, is never diſcerned beyond the primæ viæ, except in the ſuppoſed caſe of milk.

Even here, however, it cannot be certainly ſaid that it ever goes beyond what the œconomy requires: for an acid was never found in recent milk; and in the caſe of nurſes, it may be preſumed that, as in other perſons, the quantity of gaſtric and inteſtinal animal fluids, and the quantity of lymph that is always mixed with the chyle, is ſuch as, joined with the action of the lungs, will always prevent any great exceſs of aceſcent matter prevailing even in the milk. It ſeems to me highly probable, that were it not by the power of ſecretion, the ſaccharine and aceſcent matter would not appear there. From theſe conſiderations, and from the fruitleſſneſs of a change of diet towards correcting the ſuſpected aceſcency of a nurſe's milk which I have experienced, I am perſuaded that the noxious acidity which often appears in the ſtomachs of children is never to be imputed to the aceſcent diet of the nurſe, but to ſome of the other cauſes mentioned above.

Together with theſe conſiderations, I ſhall beg leave to ſuggeſt another in favour of the vegetable aliment of nurſes; at leaſt againſt their large uſe of animal food.

It appears to be, that in nurſes, for a certain length of time, the determination of the blood to the uterus and ovaria is ſuſpended; ſo that during that time neither menſtruation nor conception take place. We know, notwithſtanding,

that in some nurses both these states occur; and I am persuaded that they most readily take place in habits naturally plethoric, or rendered so by the large use of animal food. It is, however, generally and probably upon observation judged, that both menstruation and conception are always incompatible with the proper condition of a nurse; and therefore to avoid these inconveniences, it seems proper for nurses to avoid animal food altogether, or at least to take it very sparingly.

This suggests an observation that will be proper before we conclude this subject. In the earnestness I have just now expressed in recommending vegetable aliment to nurses, I had chiefly in view the state of hired nurses; who being frequently taken from the lower class of people, and who had been for the whole of their life before fed by vegetable food alone, so I had always observed bad consequences from their being put upon animal food. But I must observe here, that it is possible that hired nurses may have been before partly in the use of animal food, and that with respect to such, there may be an exception to the taking away such food entirely.

The exception, however, that I intended especially to mark here, is with respect to women of condition who may choose to nurse their own children. Such women have pretty certainly been accustomed to animal food, and perhaps to a large proportion of it: and I should not think it by any means safe to take it away from them entirely; but it would be very necessary to diminish the quantity of it a good deal, and more or less according to former habits.

It now remains to consider the use of milk as an aliment for adults. It is seldom that the milk of women, or of asses and mares, is employed for the whole, or even for a great part, of diet; but when they can be employed in sufficient quantity, there is no doubt of their being sufficiently fit for the purpose, though certainly affording a weaker nourishment than an equal quantity of the milk of ruminant animals. It is the milk of the latter, and especially that of cows, that is employed in this country; and it is almost only with respect to this that I have had sufficient opportunities of making observation, so as to treat of it properly here.

As

As the different parts of which milk in general conſiſts are all of a nutritious quality, and probably better ſuited to the purpoſe by their being introduced in a very liquid form; ſo cows milk commonly contains ſo much nutritious matter as to render it a very proper aliment: and we know that it is often ſufficient for the whole of the nouriſhment of a man, and at leaſt in many inſtances that can ſerve for a very conſiderable part of it.

While it is thus in general ſuited to the nouriſhment of men, it ſeems to be equally fit for them at every period of life except for a few months of infancy; when, though cows milk has on certain occaſions anſwered the purpoſe, yet from what has been ſaid above, it does not ſeem in any caſe quite ſo fit as the milk of women.

At every other period of life except that laſt mentioned, there can be little doubt of cows milk being a ſufficiently fit nouriſhment; but it may be more or leſs ſo at different periods. The younger children are, within the bounds mentioned, it ſeems to be the more fit; as at the ſame period, for the reaſons given above, that vegetable aliment is neceſſary: but as it is doubtful if the human œconomy can be properly ſupported by vegetable aliment alone; ſo milk, as affording a portion of alkaleſcent matter, will be properly joined with it: and we know inſtances of a numerous people who are ſuſtained in a condition fit for all the functions of life by milk and vegetable aliment alone.

There can be no doubt, therefore, of the propriety of rearing children in the ſame manner. I believe it is hardly ever neceſſary to give children under the age of puberty any quantity of animal food; and we have innumerable inſtances in this country of children reared to the moſt perfect health and ſtrength without the uſe of it, except the ſmall quantity of it that is given by an egg, and this very ſparingly and ſeldom beſtowed. On the other hand, I have often obſerved that animal food much employed under the age of puberty has very hurtful effects, particularly in giving irritability and an inflammatory diſpoſition to the ſyſtem.

We are indeed of opinion that a certain portion of animal food is intended by nature, and is very well ſuited to the hu-

man conſtitution; and in cold climates, at the poriod of life when men are to be engaged in the laborious buſineſs of life, that animal food is then eſpecially proper, and perhaps neceſſary, while at the ſame time that milk may be leſs ſufficient for the purpoſe.

How long this ſtate may continue I dare not determine; but whenever the powers and vigour of life begin to decline, as we are perſuaded that the alkaleſcent ſtate of the fluids is always increaſing as life advances; ſo the more this happens, we are inclined to think that the more plentiful uſe of milk and vegetables may be again introduced.

It appears indeed clearly enough, that milk, in a certain proportion, is an aliment very well ſuited to every period of life, and might be conſtantly employed except in certain perſons whoſe ſtomachs do not ſeem to digeſt it properly. From what cauſe this happens, it is difficult to determine. In every ſtomach milk is coagulated; but in certain ſtomachs it ſeems to be coagulated more firmly than in others, and in that ſtate to reſiſt the ſolvent powers of the gaſtric fluid: and we have had inſtances of this in which milk taken into the ſtomach was after many hours rejected by vomiting in large curdled maſſes. What this depends upon I do not know, nor have indeed learned how it is to be remedied.

In other caſes we have found that milk was more ready to become acid in certain ſtomachs than in others; and there is little doubt that in theſe alſo a coagulation takes place: but as we know that milk ſpontaneouſly coagulated, or coagulated by acids, is often taken down with perfect impunity; ſo it appears to me that the coagulation which is here joined with acidity has little or no ſhare in the diſorders which follow.

Theſe diſorders from the aceſcency of milk are the ſame, though perhaps not ſo violent as from aceſcent vegetables; and the caution that ſome have expreſſed for avoiding the combination of milk with aceſcents in diet, is without foundation; for I have known innumerable inſtances of its being practiſed with perfect ſafety.

Milk is certainly hurtful by its aceſcency in no other caſe but where the ſtomach is preternaturally diſpoſed to an aceſcent

cent fermentation; when indeed it may be hurtful, and like other acescents aggravate the disease. It is, however, to be observed in favour of milk, that when the serous part of it becomes acid in the stomach, the oily and caseous parts are particularly fit for reabsorbing and uniting with the acid towards forming an animal fluid; and it is upon this account, if I mistake not, that for the most part milk is of easy digestion, and soon fills the lacteals with chyle. Of its fitness to unite with acids we have this proof, that milk, when coagulated by acids, has that acid always joined to the coagulated part; and in the first appearances of spontaneous coagulation, the acid which is formed nearly at the same time is always intimately united with the coagulated part. It is in proof of this that I have known many instances of heart-burn, from acidity prevailing in the stomach immediately cured by a draught of fresh milk.

Having thus suggested what relates to milk as an aliment, it may be proper also to say a little of it as a medicine, as I shall not have another opportunity of doing so in this work.

It has been mentioned above, that though milk as taken in is not chyle, yet it is readily, and perhaps more readily than any other aliment, formed into a proper chyle; and therefore wherever the digestive organs are weak, milk may more certainly than any other matter supply nourishment to the body. Upon this account milk is a restorative medicine in all cases of emaciation and debility, at least in all cases where the digestive organs are not affected in a manner that renders them unfit for the digestion of it.

Not only, however, in a weakness of the solids, but also in every case of vitiated fluids, milk may be supposed to be a remedy. Indeed there can be no doubt of its affording a supply of animal fluid of the most perfect kind; that is, a fluid that has no tendency to increase the alkalescency or acescency of the mass of blood, and is rather fitted to correct both of these tendencies when they happen to prevail. At the same time, as by its liquidity it passes readily by the excretions, it can hardly give too full a state of the sanguiferous system; and while it carries nourishment enough to obviate too empty a state of the same, we may conclude it to be fitted

fitted to give the quantity of fluids the beſt adjuſted to the ſyſtem.

Whilſt milk is thus fitted to give both in quality and quantity the moſt perfect ſtate of the fluids, if we conſider that all foreign matters introduced into, or vitiated fluids generated in, the body, are ſuited to make a part of the ſeroſity, and thereby to paſs off by the excretions, we ſhall readily find that milk employed for ſome length of time may not only be a means of correcting, but may alſo give occaſion to the expelling, of every fault that has taken place in the fluids.

This doctrine may be held in general to be very true; but we muſt allow that there may be exceptions to it. If the fluids ſhall have been vitiated by a ferment added to them, as ſeems to be the caſe in the lues venerea, and frequently alſo, as we judge, in cancerous caſes, we find that milk may often moderate the violence of the diſeaſe, but will by no means cure it, unleſs ſome means of correcting and expelling the ferment be at the ſame time employed. There may be other caſes alſo in which there may be ſuppoſed an acrimony diffuſed in the fluids, which milk may not be found ſufficient to correct, and therefore to cure the diſeaſe. In ſuch caſes, however, we ſuppoſe that the diſeaſe does not conſiſt in the acrimony of the fluids alone, but in a faulty ſtate of the general ſyſtem, or in the functions of ſome particular parts, which gives occaſion to the ſtagnation and corruption of the fluids; and ſuch ſeems to be the caſe in many cutaneous affections which milk does not cure.

There is one diſeaſe in which a particular acrimony is ſuppoſed to prevail, and there are ſymptoms of it which ſupport that ſuppoſition; but milk does not prove the cure of it. This is the ſcrophula, which often appears in children living almoſt entirely upon milk; and in many caſes I have been perſuaded that it was rather aggravated by the large uſe of milk in the diet of the perſons affected. The diſeaſe indeed appears to me to depend upon a certain ſtate of the lymphatic ſyſtem which we do not underſtand; but we can ſay from experience that milk does not ſeem to have any power in correcting it.

From

From what has been said, it will be allowed that milk may be a remedy in many and various diseases; but it will be proper here to take particular notice of certain diseases to which milk has been supposed to be particularly appropriated.

The first I shall mention is the phthisis pulmonalis: and how milk is adapted to many cases of this will not be difficult to find. However we may explain the origin of this disease, I would maintain that it never discovers its peculiar symptoms without discovering at the same time a phlogistic diathesis in the whole system. But as milk affords a less quantity of gluten, and a less alkalescent fluid, than any entirely animal food; so it must be of service in obviating a phlogistic diathesis, and may in time take off the tendency to it entirely. By this means it may moderate, and perhaps cure the disease. These effects may be obtained by milk of any kind; but it will be correspondent with our doctrine to remark, that it will be most effectually obtained by the milk of the non-ruminant animals; and of these by the milk of asses or mares more certainly than by that of women. Possibly there may be cases in which the purpose may be obtained by the use of whey more certainly than by milk of any kind.

It has been a common opinion, that the milk of women is better suited to the purpose than that of any other animal; but I doubt of this, as this milk has a larger proportion of of oil in it than that of asses or mares; and considering how seldom it is that a quantity of womens milk sufficient for an adult can be obtained, the use of asses milk seems to be the more certain practice.

While I thus find the use of milk to be a remedy of phthisis pulmonalis, by its being fitted to obviate and remove a phlogistic diathesis, it may be asked why a nourishment more entirely vegetable might not be still fitter for the purpose? This doubt it is difficult to solve: but to do it as well as I can, I shall observe, that though possibly it may be true that a more entirely vegetable nourishment might be a more certain remedy, and that there are many examples of its success alleged; yet it may not be always the proper remedy, as there are cases of phthisis pulmonalis, which, though attended with phlogistic diathesis, are at the same time attended with

with a weakneſs of the digeſtive organs with reſpect to purely vegetable aliments.

It may be alſo obſerved, that though a phthiſis may be very conſtantly attended with phlogiſtic diatheſis, it is at the ſame time often attended with a ſtate of great debility; and it may be dangerous to increaſe that too much, as a diet purely vegetable might do. But as I have not had an opportunity of determining theſe matters by any exact and deciſive experiments, I muſt leave it to the judgment of others to determine poſitively whether a milk diet be univerſally, or even very generally, the moſt proper remedy of a phthiſis pulmonalis. I muſt quit the ſubject with this obſervation, that it will be difficult to determine univerſally with regard to this matter, as it is pretty certain that the caſes of phthiſis pulmonalis are more varied in their origin and circumſtances than phyſicians have either perceived or explained.

Another diſeaſe to which it is alleged that milk is the proper remedy, is the gout. It will not be wondered that diſputes have ariſen upon this ſubject, when we conſider what different opinions have been maintained with reſpect to the nature of the diſeaſe, and that every difference on this ſubject may give a different opinion with reſpect to the propriety of remedies. I ſhall not here venture to decide between theſe different opinions, nor enter into any of the diſputes that have ariſen upon the ſubject; but ſhall deliver the doctrine that appears to me the moſt probable, and ſubmit it to the judgment of others.

It ſeems to me that the gout always begins in a plethoric habit, and that it is ſupported and made ready to recur by the ſame; and conſequently that if a man never uſed animal food, he would never have the gout: and that this is commonly the caſe is ſtrongly confirmed by this, that there is hardly an inſtance of men who have been reared, and who have lived very entirely, upon a milk and vegetable diet, ever having the diſeaſe. To this conſideration may be joined that of the many inſtances of men who by accident have been reduced to low living being cured of the gout, with which before they had been long afflicted. To apply this to our preſent ſubject, we ſhall obſerve, that as milk can never give a plethoric habit, ſo we believe that a diet conſiſting

fifting chiefly of milk will fave a perfon from ever being attacked with the gout. As we know, however, that in the plethoric habits liable to this difeafe, a certain degree of vigour, and a certain firmnefs of tone in the whole fyftem, particularly difcovered by the ftate of that in the ftomach, is neceffary to produce the inflammation of the extremities, the neceffary crifis in fuch habits; fo various diforders may be occafioned in fuch perfons by diminifhing the vigour and tone of the fyftem. Accordingly it is poffible that a milk diet, more efpecially as a change from one more nourifhing, may have that effect; and I am therefore of opinion, that for entirely preventing the gout, it is neceffary that a milk diet be entered upon early in life, before the gouty diathefis be formed. But if, after the gout has come on, a milk diet is to be employed for a cure, it muft be in perfons of entire vigour only; and there are inftances of its being employed in fuch with advantage and fafety. In gouty perfons, however, advanced in life, and who are liable to a lofs of tone, there may be much danger in attempting a milk diet; but at the fame time I muft fay, that as milk is not fo weak a diet as one entirely of vegetables, fo the former will always be more fafe than the latter.

It has been alleged by feveral, that for preventing or curing the gout, a milk diet for life was not neceffary, but that employing it ftrictly for one year was fufficient. It is poffible that at a certain period of life it may be fo, by taking off the difpofition to a plethoric ftate, which after a certain period of life is not ready to return: but this is certainly precarious; for there are many inftances of perfons who had, for curing the gout, taken to a milk or vegetable diet for fome time, and after being relieved by it, had returned to a fuller diet; which not only brought back the gout with more violence than before, but occafioned alfo various diforders in their bodies: and I am perfuaded, that after an abftemious courfe for fome time, it can hardly ever be fafe to return to a free and full diet.

Several phyficians have propofed milk as a remedy in all febrile difeafes: and I have already remarked, that a diet of milk without any animal food joined with it, is often ufeful both in obviating and correcting a phlogiftic diathefis prevailing in the fyftem, and confequently any febrile ftate connected

nected with it. But we must now observe, that when a pyrexia or fever is fully formed, the use of entire milk is an ambiguous remedy. In cases of continued fever, I have seldom found entire milk to be grateful beverage; and it hardly quenches thirst. In most cases, I have observed it to prove disagreeable to the stomach, and often to excite the thirst it was intended to remove. This I have observed in formed fevers of all kinds, whether inflammatory or putrid. In fever, there seems to be in the state of the stomach somewhat unsuitable to the proper digestion of milk. Wherein this consists I cannot clearly explain; but from much experience I am certain of the fact. In spite, therefore, of the general and promiscuous commendations above mentioned, I never prescribe entire milk in any case of fever; and more especially as milk in its more liquid and acid states is more agreeable, and seems to answer better every purpose that can be proposed.

After thus considering the use of milk in general, as alimentary or medicinal, it may be proper to consider what choice is to be made of the different milks that may be employed; and this may be determined very shortly.

Wherever the purpose is to introduce much nourishment, and where there is no hazard of favouring a plethoric state, the milk of the ruminating animals is always to be preferred, providing only that the digestive organs of the patient are quite sufficient for the digestion of it.

Upon the other hand, when the purpose is to obviate and diminish a plethoric state and phlogistic diathesis, it will be most proper to employ the milk of the non-ruminant animals, and especially when at the same time the organs of digestion may be suspected of weakness.

To conclude this subject, it remains for me to say, in what manner entire milk may be most properly employed: And there can be no doubt that for every purpose it will be most proper in its most recent state; and certainly before it has proceeded to that separation of its parts to which it is disposed. Most physicians, and particularly Dr. BOERHAAVE, have supposed that it cannot be exposed for any length of time to the air, without exhaling a volatile and highly valuable portion

portion of it; but no body has been able to give any clear proof of any such exhalations taking place, or to shew the nature of it. In the mean time, they have used this argument for supposing it, that it is on this account that, in the principal use of it, the nourishing of infants, nature has appointed it to be drawn from the breasts by sucking; thus providing that it should have no communication with the air till it was taken into the stomach of the young animal. This argument, however, like many others taken from our judgment of final causes, is fallacious. In the brute creation, we do not perceive that any of them are instructed, or could practise, any other means of drawing milk from the udders of the female, or of communicating it to their offspring, than this of sucking; and though the human species are capable of some artificial means to this purpose, I am well persuaded that it is impossible by any artifice to draw the whole of the milk from the breasts of a woman except by an infant's sucking; and that this is the reason for the institution of nature in this respect, without implying that milk suffers any hurtful change from its being for a short time exposed to the air.

To render it still more clear that milk cannot be hurt by the loss of any volatile parts, we are pretty well assured by this, that many nations are in the constant practice of giving a certain degree of boiling to their cows milk immediately after it is drawn from the cow, and this without their finding that the qualities of the milk, for any purpose that it can be applied to, are in any manner injured. On the contrary, they find, that by boiling the milk is less disposed to acescency, probably in consequence of its being by boiling deprived of a considerable quantity of air that might have been favourable to that fermentation.

Another part of our subject yet remains, which is, to ascertain the alimentary or medicinal qualities of the several parts of milk when employed in their separate state; but what we have to observe with regard to this shall be mentioned very shortly.

Butter, or the oily part of milk, has precisely the same qualities as are to be found in the other expressed, or, as they are called, Fat Oils, whether taken from animals or vegetables;

vegetables; and the use of all of them, as employed either in diet or medicine, we shall have occasion to consider in another place. The only question that might particularly occur here is, Whether the oily part of milk is most safely employed in the state of cream, when it is joined with some portion of the caseous and serous parts, or when it is more entirely separated from these in the state of butter. I cannot be positive in answering this question; but it appears to me, that a quantity of oil in the state of cream will be more easily digested than an equal quantity of the oily part in the state of butter. Some difference, however, in this matter may arise from the difference of stomachs more or less disposed to digest oils; and I have known persons who could digest cream better than they could butter. Another difference in this respect may also arise from the stomach being more or less disposed to acidity; and in the more acescent stomach, cream may be more offensive than butter.

The caseous or coagulable part of milk is certainly a great, if not the greatest, part of the nourishment which milk affords; and therefore taken by itself must be considered as a very nourishing matter. Even when taken as produced by spontaneous coagulation, though then very much separated from the oily part, it may be considered as nutritive. But when an artificial coagulation has been practised upon new milk, and when therefore the oily part is joined with the caseous, it must be considered as containing nearly the whole of the nutritious matter of the milk it is taken from; and if the coagulum is taken without the whey being separated from it, it certainly contains the whole, and will be as easily digested as fluid milk taken in. It is therefore a matter of indifference, both with respect to digestion and nourishment, whether milk be taken in its fluid or in its recently coagulated state.

When the coagulum has the whey separated from it, it then becomes a more nutritious substance than the milk it was taken from, but will probably be of more difficult digestion than either that or the entire coagulum just now spoken of. Whilst, however, the coagulum, from which the whey has been in a great part separated, remains still in a humid state, that is, with a portion of the whey still adhering

hering to it, it will be of more eaſy digeſtion than when that humidity is more fully taken away, and the whole maſs preſſed more cloſely together is brought into the form of cheeſe.

Cheeſe in its dried ſtate is, as we have ſaid above, in very various condition; but its qualities in theſe different conditions may be readily perceived. When it is made from milk previouſly deprived of its cream, it may be ſtill a very nutritious matter, but of very difficult digeſtion, and fit only for the moſt robuſt perſons; and even the difficulty of digeſtion may diminiſh the nouriſhment which it might otherwiſe have afforded.

Cheeſe made of entire milk muſt be a ſtill more nouriſhing ſubſtance, and I believe of much eaſier digeſtion; and cheeſe made of entire milk, with a portion of cream taken from other milk added to it, will be ſtill more nouriſhing, and hardly of leſs eaſy digeſtion, as the oily parts every where interpoſed between the parts of the gluten muſt render the adheſion of this leſs firm. As cheeſe is often made of cream alone, the qualities of this will be readily underſtood from what has been juſt now ſaid.

We have likewiſe mentioned above, that cheeſe is not always made of cows milk only, but alſo of the milk of ewes or goats, and often of a portion of the two latter added to cows milk. In all theſe caſes, as the milk of ewes and goats contains a larger proportion both of the oily and caſeous parts, ſo in proportion as theſe are employed, the cheeſe becomes more nutritious, but at the ſame time of more difficult digeſtion.

As cheeſe is employed not only when recent and freſh, but alſo under various degrees of a certain corruption it is liable to, ſo by this it acquires new qualities; and according to the degree of corruption, it becomes more acrid and ſtimulant, partly from the acrimony it has acquired by corruption, and partly by the great number of inſects that are very conſtantly generated in it in that ſtate. In this corrupted condition, cheeſe can hardly be taken in ſuch quantity as to be conſidered as alimentary; and in what meaſure

meaſure or manner it may be, as is commonly ſuppoſed, conſidered as a condiment influencing the digeſtion of other food in the ſtomach, I cannot clearly explain.

With reſpect to cheeſe, there is yet one particular to be mentioned, and which is to remark, that it is often eat after having been toaſted, that is, heated over the fire to a conſiderable degree; whereby a portion of its oil is ſeparated, whilſt the other parts are united more cloſely together. I know many perſons who ſeem to digeſt this food pretty well; but it is certainly not eaſily digeſted by weak ſtomachs: and for thoſe who can be hurt by indigeſtion, or heated by a heavy ſupper, it is a very improper diet.

Many people, eſpecially the poor in mountainous and paſture countries, uſe milk very much in a coagulated ſtate. There is a particular manner of employing it; which, for ought I know, is peculiar to Scotland, and, as I judge, deſerves to be taken notice of.

The preparation of it is as follows. A portion of ſkimmed milk is put into a wooden veſſel, deeper than wide, and which has a hole in its bottom ſtopped up with a peg, which upon being taken out will allow a liquor to be drawn out of the veſſel. This veſſel is to be ſet in another that is wider and deeper, and in which, therefore, the ſmaller veſſel may be ſurrounded with boiling water. When this is done, the veſſels are allowed to remain for one or two days, more or leſs according to the ſtate of the weather; after which time the milk is found coagulated, and the watery part ſeparated from the coagulum has ſubſided to the bottom of the veſſel. This acid water is then drawn off by the aperture above mentioned; and the ſmall veſſel being again ſtopped up, it is again ſet in the larger veſſel, to be ſurrounded with boiling water as before. After matters have remained in this ſtate for twenty-four hours longer, it is found that more of an acid water has been ſeparated from the coagulum; and this water being drawn off as before, the coagulum, now of a pretty thick conſiſtence, is ſtirred and agitated pretty briſkly by a wooden ſtick; and in this condition it is preſented upon our tables.

This

This diſh, during the whole of the ſummer, in Scotland, is often uſed by the middling rank of people, and is well known at Edinburgh under the name of Coſtorphin Cream, and as denominated from the neighbouring village, in which it is eſpecially prepared; it is brought to market in all the conſiderable towns of Scotland. It is an aliment tolerably nouriſhing; and by the quantity of acid ſtill retained in it is moderately, but gratefully, acid and cooling. I have frequently preſcribed it to phthiſical patients; and neither in theſe, nor in any other perſons, have I ever known any diſorders of the ſtomach or inteſtines ariſing from the free uſe of it.

After having thus conſidered every thing relating to the caſeous part of milk, there remains to be conſidered what we marked above as a third part in the compoſition of all milk, and which is its watery part.

This we ſhall conſider firſt as in the ſtate of *butter-milk* produced in the manner above deſcribed. This is commonly procured from milk after it has been kept for ſome time, and has become more or leſs acid: but it may be procured from very recent milk; and in this caſe the butter-milk is not acid, and only differs from entire milk by the oily part being taken away. In this ſtate it is ſtill tolerably nouriſhing; and being often more eaſily digeſted than entire milk, I have often employed it in phthiſical caſes with more advantage than I could do either the entire milk or the watery parts of it in a more acid ſtate. It is in this laſt ſtate, however, that it is moſt commonly employed; and it is highly uſeful in all caſes where the refrigerant powers of milk are required. As the longer it has been kept it ſeems to have its acidity increaſed, ſo it proves more powerfully refrigerant. Some have imagined that in certain caſes it might be dangerous: but unleſs when drank in very large quantity, or when the body is very warm, I have not perceived its bad effects; and in the laſt caſe, it is probable that cold water would have done the ſame miſchief. With reſpect to the acid of butter-milk, or other acid ſtates of the watery part of milk, it is worth obſerving, that ſuch acid does not increaſe the aceſcency of the ſtomach, or occaſion the flatulency that recent vegetable acids and aceſcents

cents commonly do; and therefore it is more ſafely than theſe employed in dyſpeptic perſons.

The ſtate in which the watery part of milk is chiefly employed, is that of *whey* ſtrictly ſo called. As this is ſeparated from entire milk, and from a coagulum produced by runnet; ſo, beſides a ſaccharine matter, it always contains a portion of the oily and caſeous parts, and in conſequence is a nutritious fluid. It is, however, ſtill leſs ſo than entire milk; and therefore when a plethoric or phlogiſtic ſtate of the fluids is to be obviated or corrected, it ſeems to be fitter for the purpoſe than any entire milk, though it may be doubtful if the whey of the milk of ruminant animals may not be as nutritious as the entire milk of the non-ruminants.

Whey, however, is chiefly to be conſidered on account of its peculiar ingredient of ſugar; which by its being afforded by this and ſo many other alimentary ſubſtances, muſt be conſidered as of the moſt ſalutary nature with reſpect to the human œconomy. It is by this, or by the acid which it is changed into, that it muſt be conſidered as peculiarly ſuited to obviate the phlogiſtic and too alkaleſcent ſtate of the human fluids; and as whey can be commonly taken in greater quantity than any entire milk, it may in many caſes of diſeaſe be a more effectual remedy. It is only upon this ſuppoſition of its being introduced in larger proportion, that I can underſtand the ſo-much-commended virtues of the *ſugar of milk*; for when this is purified to a certain degree, I cannot perceive that it differs from the ſugar obtained from the ſugar-cane or other ſubſtances; and when employed in its impure ſtate, I cannot conceive that much virtue can be ſuppoſed to be given to it by the ſmall portion of the other parts of milk which may be adhering to it.

Hitherto we have conſidered whey as taken in before it has undergone any aceſcent fermentation: but it is frequently taken in its acid ſtate as a part of, or along with, alimentary ſubſtances; and in this ſtate muſt be viewed as leſs nutritious, and chiefly as an acid only uſeful for the purpoſes above mentioned. It is now, however, to be obſerved with reſpect to the qualities of whey, that from its diſpoſition

on to aceſcency in certain ſtomachs it may ſuffer this change to a noxious degree, and ſhow the flatulency and other circumſtances attending the caſes of morbid aceſcency. It is by the ſame ſaccharine quality that it proves a laxative; but whether this depends upon its retaining its entire ſaccharine ſtate, and in that ſtate ſtimulating the inteſtines, or that it depends upon the acid produced from it mixed with the bile, we ſhall have occaſion to conſider in another place.

ARTICLE II. *Of Animal Food ſtrictly ſo called; that is, Food conſiſting of the whole, or of part, of the Subſtance of Animals.*

The ſolid and fluid parts of the mammalia are ſo nearly of the ſame nature with one another, that the fitneſs of all of them for nouriſhing any of the other who live on animal food, and therefore the fitneſs more or leſs of all of them for nouriſhing the human ſpecies, can hardly be doubted of, and is very well eſtabliſhed by much experience. In conſidering, therefore, the mammalia as affording aliment to man, we have only to examine the greater or leſs fitneſs of the ſeveral orders, genera, and ſpecies, for that purpoſe. This we ſhall do, in the firſt place, by conſidering thoſe qualities of animal food, by which it is more or leſs fitted to be an aliment to man; and afterwards, we ſhall inquire how far theſe qualities are to be found in the particular ſpecies of animals commonly employed for this purpoſe.

That quality of animal ſubſtances fitting them to be aliments which firſt deſerves to be mentioned, ſeems to me to be the degree of ſolubility in the human ſtomach. The ſolution of food in the human ſtomach may be aſſiſted by manducation, but certainly depends for the moſt part upon the power of what is commonly called the gaſtric juice, which nature has provided as a ſolvent to a certain degree of the ſeveral ſolid or conſiſtent matters taken down into the ſtomach.

This ſolvent, however, as we have obſerved above, is of greater or leſs power in different animals; and ſo it ſeems to be in the different individuals of the human kind. How far this may depend upon different ſtates of the gaſtric fluid in different men, we have not yet been able to diſcern; but in all of them it ſeems to be manifeſtly different according to certain conditions in the aliments taken in, and particularly from theſe giving it a different degree of ſolubility; and which are therefore to be eſpecially inveſtigated.

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The condition especially giving more or less of solubility, is the different firmness of texture which appears in animal substances: and this again is different in the different species of animals, according as these are either very entirely carnivorous or phytivorous; the substance of the former being more dense than that of the latter. This, joined with some other considerations, explains why the former are hardly ever, and the latter so generally, employed as aliments to man. It may be supposed that this difference in the density of the substance depends upon the nature of the aliment which these different sets of animals employ; and therefore that even those who employ a food partly animal and partly vegetable, should be of a more dense substance than those who live entirely upon vegetables. This, however, does not appear to be strictly the case; for the substance of the bull is more dense than that of the dog.

2*dly*, In the phytivorous animals the density of the substance is different in the different genera and species by an institution of nature, of which the cause cannot be assigned; but the fact is very evident, as the density of beef is *cæteris paribus* always greater than that of mutton.

3*dly*, In the same species the density is different according to the sex; the substance of the male being always more dense than that of the female. In the male sex, however, castration at an early period of life makes a considerable change, as it prevents the animal from acquiring the same density of substance which it would have acquired had the genitals remained entire. Castration has also the effect of disposing the animal to grow fat, which, as we shall say presently, has an effect in rendering meat more soluble.

4*thly*, In the same species, the density of its substance is different according to the age of the animal; and as the density of every animal is always increasing as the animal advances in life, so young meat is universally more soluble than old: and this goes so far, that in many species we employ only the young and hardly ever the older animals in diet. There is, however, a difficulty which occurs here. Although from their texture young meats are more soluble than old, and appear to be so in decoctions with water, yet in some stomachs the young meats are more slowly digested than the old; and

thus in some persons veal is more slowly digested than beef, and lamb than mutton. Indeed Dr. BRIAN ROBINSON has given us this singular fact, that in one person he found chicken to be more slowly dissolved than any other animal food. What this is owing to, is difficult to determine. Whether in certain stomachs very much disposed to acescency, the solution of animal meats may not be delayed by that acescency, and that in such stomach the most alkalescent foods will be most easily digested? And as we shall say in the sequel that the older meats are more alkalescent than the younger, this may perhaps account for the difference mentioned, that sometimes occurs in the digestion of them. We are disposed to think that it does so, because it is observed that the difficult digestion of young meats happens especially in the most acescent stomachs.

Another cause for the difference of digestion mentioned may in some cases be the more gelatinous nature of young meats than of old: and this seems to have a share; for I find the jellies of all animal substances, though extracted from old animals, to putrify more slowly, and with more previous acescency, than the recent juices of animals. It may not be improper to observe also here, that in acescent stomachs, liquid aliments, though extracted from animal substances, are more difficultly digested than solid meats. Does not this happen from the liquidity favouring acescency?

5*thly*, In animals of the same species, sex, and age, the flesh of individuals is of greater or less density as they are fatter or leaner. In lean animals, the fibres of which their flesh is composed are more closely compacted together, while in fatter animals these fibres are more separated by a cellular texture filled with oil; and the flesh of the latter, therefore, is not only rendered more soluble by the laxity of its texture, but also as we judge by the quantity of oil which enters into the substance of the fibres.

Sometimes, however, it happens, that fat meats are of more difficult digestion than those that are leaner: but this arises from the fat in those meats being collected in masses separate from the fleshy fibres; and in such cases the difficulty of digestion arises from the difficulty of digesting a large proportion

portion of oil; with reſpect to which indeed, as we ſhall ſay hereafter, the power of different ſtomachs is very different.

6thly, In the ſame animal the ſolubility is different in the different parts of it. Of the fleſhy parts connected by a looſer cellular texture, the ſolution readily takes place; whereas of the membranous parts in the tendons and ligaments, in which that texture is more cloſely compacted, the ſolution is more difficult.

7thly, In meats in other reſpects of the ſame qualities, their ſolubility is greater according as they happen to be further advanced towards putrefaction. It is well known that putrefaction to a certain degree deſtroys the coheſion of all animal ſubſtances; and the tendency to this, if it be not prevented by the want of air, by cold, or antiſeptics, applied, begins as ſoon as the animal dies. It is for this reaſon that meats recently killed are not ſo ſoluble as thoſe that have been kept for ſome time. There is, however, a period in the progreſs of putrefaction at which meats become unfit for the human œconomy: but it is difficult to determine the limits of this; for there are certain ſtomachs to which meats, when any approach to putrefaction is diſcoverable in them either by their taſte or ſmell, are highly offenſive; while there are many ſtomachs in which meats highly tainted are readily digeſted, and perhaps more readily than freſher meat.

8thly, Not only are animal ſubſtances more ſoluble as they are more advanced towards putrefaction; but they ſeem alſo to be ſo according as they are more diſpoſed to ſuffer that change, or, as I would otherwiſe expreſs it, as they are more alkaleſcent.

It is very probable that this is not only different in different animals, but alſo in individuals at different times; although we find it difficult to diſtinguiſh the different degrees of it, or to aſſign the cauſes of theſe. In many caſes it ſeems to depend upon an inſtitution of nature, giving more of this quality to one genus or ſpecies of animals than to another, without our being able clearly to explain the cauſes of this: but the natural conſtitution of the animal being given, we can often mark the ſubſtances which increaſe or diminiſh this quality and diſpoſition in individuals; and it will certainly be

of

of uſe to aſcertain theſe as well as we can. The ſtate of it ſeems to be according to the age of the animal, according to the diet it lives upon, and particularly according to its habit of more or leſs exerciſe.

As an alkaleſcency is the peculiar diſpoſition of the animal œconomy, ſo it is probable that this increaſes as life advances; and as we have given above ſome reaſons for believing young meats to be leſs alkaleſcent than old, ſo there are ſeveral marks of the fluids becoming more acrid as life advances; and therefore that the alkaleſcency of animal ſubſtances may be in general according to the age of the animal.

With reſpect to diet, there can be little doubt that the alkaleſcency of the animal fluids will be greater or leſs according to the difference of food on which the animal lives; and accordingly that it is manifeſtly greater in the entirely carnivorous, than it is in the entirely phytivorous, animals: and this, as I have ſaid before, we take to be the reaſon or inſtinct determining the former to be ſo rarely, and the latter ſo commonly, the food of mankind. With reſpect to theſe animals that live ſometimes on a vegetable and ſometimes on an animal diet, we have a clear illuſtration in the experiments of Dr. YOUNG on bitches, ſerving to ſhow the influence of animal flood in giving alkaleſcency to the animal fluids.

Of the quadruped kind there are none employed in the diet of this country which gives us an opportunity of marking the effects of ſuch a difference of diet; but probably ſome difference might ariſe from their living upon grain, or more entirely upon graſs: and in the bird-kind there is probably a conſiderable difference ariſing from the bird's living more upon animal food or more upon vegetables; as we ſhall more particularly take notice of in the ſequel.

Laſtly, The alkaleſcency of animal food ſeems to depend upon the animal's being more or leſs in the habits of exerciſe. As it is ſufficiently probable that the alkaleſcency of the animal fluids is in ſome meaſure produced, and always increaſed, by the activity of the circulation: and as this therefore is greatly increaſed by exerciſe, ſo it is probable that animals, the more they are in the habits of exerciſe, will have their fluids

fluids in a more alkalescent state: and this is confirmed by every other means we have of judging of this matter; as we shall say more particularly hereafter.

To conclude this subject; it may be supposed, that the alkalescency of the different animal substances might be determined by the different proportion of volatile alkali, which might be obtained from them by distillation: but to this purpose few or no experiments have been made on the different alimentary substances; and although it is probable that some difference might be found, yet from several trials made by us, the difference is so inconsiderable, that it will be difficult to ascertain it with much precision, and therefore to apply it to the present subject.

Besides considering animal aliments by the difference of their solubility, as we have done, they may also be considered by their being more or less perspirable. SANCTORIUS's account of mutton, and KEILL's account of oysters, might lead to an opinion, that the difference in this respect is considerable; but DE GORTER found neither the one nor the other fact confirmed by his experiments. It is, however, still highly probable that aliments, and even animal aliments, are different in this respect; and the matter deserves to be examined by experiment. I am indeed very much surprised that more observations on this subject had not occurred to SANCTORIUS, and other persons who have been engaged in experiments upon perspiration: but I must own, from the experiments I have myself made, that the difference is commonly so inconsiderable, and so many other circumstances may at the same time concur to vary the state of perspiration, that it will be always difficult to determine what depends upon the aliment alone.

In the mean time, I would reason in this manner: As they are the alkalescent parts of the animal fluids that form the excretions, we are persuaded that *cæteris paribus* the different animal aliments will be perspirable in proportion to their alkalescency, as determined above: and so far as experiments in this way can be trusted, our opinion is confirmed by experiment; and particularly that the old, or as I may call them the more saline, meats, are more readily perspired than the young and gelatinous.

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The laſt conſideration I have to offer with reſpect to the aliments taken from quadrupeds, is, that they differ according to the quantity of nouriſhment they ſeverally contain; which, however, we find to be a matter difficult to determine. It might be ſuppoſed that it would be according to the quantity of ſoluble matter, and therefore of the extracts obtained by the ſolutions which we practiſe out of the body: but this we cannot readily admit of, when we conſider and believe that the gaſtric juice can diſſolve the whole of the ſubſtance of the ſeveral aliments more entirely, certainly more quickly, than can be done by any application of boiling water; and therefore we are of opinion that the quantity of nouriſhment in the ſeveral aliments we are conſidering, is to be eſtimated by the quantity of animal matter in each of the ſeveral kinds that is ſoluble by the gaſtric juice, and will therefore be according to their reſpective denſities.

We have ſuppoſed that the aliments will be more or leſs quickly diſſolved by the gaſtric juice according to the degrees of ſolubility in each, as determined by the circumſtances above mentioned: but whether there are any limits ſet to the powers of the gaſtric juice, with reſpect to its more or leſs complete ſolution of all the parts of the ſubſtance which it anywiſe diſſolves, we cannot poſitively determine. The gaſtric juice of the human ſtomach does not diſſolve the bones or cartilages of animals; and perhaps it diſſolves the more firm and membranous parts leſs completely than it does the fleſhy: and it ſeems to be the latter only which it diſſolves very entirely. Whether it makes any decompoſition even of theſe, as decoction in water does, and therefore leaves ſome portion of their earthy parts undiſſolved, I would not poſitively determine: but ſuch a decompoſition ſeems to me very improbable; and therefore would conclude, as above, that the quantity of nouriſhment in any meat which the gaſtric juice entirely diſſolves, is in proportion to the quantity of animal matter which it contains. Upon this ground I would conclude, that in equal weights of beef and veal, notwithſtanding what appears in their decoctions, there is more nouriſhment in the former than in the latter; and our experience in the feeding of animals who take in ſuch food is certainly in confirmation of this. What difference may ariſe from the more alkaleſcent and perſpirable ſtate of the one, and from the more gelatinous and leſs perſpirable ſtate of the other, I leave to further conſideration.

To

To conclude the general conſideration of aliments taken from quadrupeds, I muſt ſay a little of their effects in general on the human conſtitution.

The firſt effect to be taken notice of is their giving, in the ſame proportion taken in, more nouriſhment than any vegetable aliments do. The latter can afford, as we have ſaid, the whole juices of an animal body, but certainly not in proportion to the quantity of them taken in; whilſt animal ſubſtances that can be entirely diſſolved in the gaſtric juice ſeem in proportion to that quantity to be entirely convertible, as the expreſſion is *in ſuccum et ſanguinem.* If at the ſame time they are in the ſmalleſt quantity leſs perſpired, they muſt greatly increaſe the plethoric ſtate of the blood-veſſels. Animal food, therefore, is always ready to induce this ſtate; and in growing bodies, ſuch food will always favour, and probably haſten, the growth: and although in adults, exerciſe and other means, by ſupporting the excretions, may prevent its having this effect, yet it will always have a tendency to produce a plethora ad volumen. Moreover, as animal aliments for the moſt part introduce a greater proportion of oily matter, they are ready to occaſion a larger ſecretion of oil into the adipoſe membrane, and thereby produce obeſity; which when conſiderable muſt ſtraiten the ſanguiferous veſſels, and conſequently produce a plethora ad ſpatium.

Animal food having thus a conſiderable tendency to fill the blood-veſſels, ſo it muſt ſupport the conſtant tenſion of theſe, and thereby, in my opinion, give a greater degree of ſtrength to the whole body; and from the doctrines laid down above on the ſubject of irritability, it will alſo readily appear, that animal food is likely to increaſe the irritability of the ſyſtem.

It deſerves to be particularly attended to, that as the balance between the ſeveral parts of the ſyſtem may not always be exact, ſo the plethoric ſtate may be greater in one part than in another; and thus if it happens to give a greater tenſion to the veſſels of the brain, it may diſpoſe to epilepſy; or if it happens to give an increaſed tenſion to the veſſels of the lungs, it may diſpoſe to aſthma. More particularly, if it be conſidered, that in all full ſyſtems, the lungs

lungs must always be most exquisitely filled; and that nature has provided that the vessels of the brain should always have a due degree of tension: so it will be readily understood why these two parts of the system must always be readily affected by every unusual fulness of the sanguiferous system, and from the general irritability at the same time induced, may give occasion to many particular diseases.

It is also to be observed, that when animal food gives a general fulness of the blood-vessels, if the balance between the arteries and veins be not exactly adjusted, an undue proportion may take place; and if more than usual is retained in the arteries, it may give occasion to arterial hemorrhagy; or, if a greater quantity of blood than usual is thrown upon the veins, it may produce an overcharge either in the system of the vena portarum, or in the venous system of the head; and what consequences may arise from either of these circumstances, I need not explain.

Some of our readers may perhaps judge, that a great part of what I have now said might have been left to be understood from the general doctrine of Plethora; but both because I think that general doctrine has not been always well understood, and because when it was my business to explain the effects of animal food, I thought it necessary to show, that its effects are especially to give a nicer balance in several respects to the system, and thereby give a disposition to many diseases which might be avoided by a more temperate use of such food. It deserves also to be remarked, that though a proper measure of such aliment, with an exercise suitable to it, may render it long consistent with health, yet as the constant use of it gives a nicer balance to the several parts of the system, so every unusually large indulgence in it must be extremely dangerous.

This leads me to take notice of what perhaps I should have begun with; that is to mention the effects of animal food, as it is immediately taken into the stomach: but I still think it will be more proper after what I have said.

We are of opinion, that every kind of food taken into the stomach, as soon as it sets this organ to work, increases the action of the heart, and occasions a frequency of pulse; and

and if we miſtake not, by the energy of the brain's being thus directed to the heart and ſtomach, a torpor in the animal functions, both of ſenſe and motion, is induced, and often to a degree of ſleepineſs. Theſe are the effects of food ſoon after it is taken into the ſtomach; and it ſeems alſo manifeſt, that theſe effects are more conſiderable from animal than from vegetable food. It ſeems alſo equally manifeſt, that the feveriſh ſtate during digeſtion is in proportion to the alkaleſcency of the animal food taken in, and that the degree of torpor induced, and the continuance of the feveriſh ſtate, is more or leſs according to the quantity of food taken in, and according to its being more or leſs readily ſoluble by the gaſtric juice.

From theſe conſiderations, the whole phenomena of digeſtion, with reſpect to the ſyſtem, may be explained; and, upon the whole, that although animal food may be admiſſible by the human œconomy; and in certain circumſtances of that it may be proper and even neceſſary; and therefore that, in many caſes, it may be conſiſtent with health; yet that, for the moſt part, a ſmall portion of it only is neceſſary; that the very temperate and ſparing uſe of it is the ſureſt means of preſerving health and obtaining long life; whilſt the large uſe of it tends to the production of diſeaſes, and to the aggravation of thoſe that from other cauſes may incidentally come on.

We are much diſpoſed to remark, that the opinion of an ancient writer, though not HIPPOCRATES, was well founded. He aſſerts, that the beſt means for preſerving health is *nunquam ſatiari cibis et impigrum eſſe ad labores*; and we believe that this was meant eſpecially with reſpect to animal food. We muſt alſo obſerve, that an otherwiſe wiſe ancient, has in our opinion given a rule of the moſt pernicious kind. When CELSUS ſays, with regard to eating, *Modo minus, modo plus juſto aſſumere*, the rule may be allowed; but when he ſays, *Et ſemper plus dummodo hunc concoquat*, he gives a very fallacious teſt of what is ſafe, and, in general, a very dangerous rule.

Before

Before I leave the ſubject of animal food in general, I muſt touch a queſtion that I think eſpecially relates to it; and that is, whether ſleeping after a full meal be ſuitable to the health of the human œconomy? If we are to truſt to the inſtitution of nature in the brute creation, and ſuppoſe that their inſtincts are generally ſuited to the health of their œconomy, it would appear that ſleep after eating is ſuited to favour their digeſtion; but whether the ſame may be ſuited to the human œconomy may be doubtful. The propenſity to ſleep after eating is commonly the ſame in man as in brutes; and I am perſuaded that, in elderly perſons after a mid-day meal, it may, in ſome degree, be indulged; but I am equally perſuaded from my obſervation and experience, that a full ſupper immediately before going to bed is generally hurtful. Whether this happens in thoſe perſons eſpecially who take two meals of animal food every day, or that a long ſleep after ſuch a meal, during which, not only the animal, but alſo the natural and vital functions ſhould have a great deal of reſt, is the cauſe of the bad conſequences which often follow, we cannot poſitively determine.

The ſolution of this and many ſuch queſtions is much embarraſſed by this, that errors in the conduct of what relates to health, when moderate in their degree, do not immediately ſhow their effects; and only after a long time, in conſequence of frequent repetition, when from our groſs ignorance of the animal œconomy we do not perceive and readily miſtake the cauſe of the diſeaſe then ariſing.

Having thus conſidered the qualities of the aliments taken from quadrupeds in general, we muſt next endeavour to ſay what of thoſe qualities prevail, and how they are diverſified in the ſeveral genera and ſpecies.

The firſt in our liſt is the Bos or *Ox* kind. The fleſh of this is the moſt denſe of all the quadrupeds; and how far that denſity goes in preventing ſolubility, we have an inſtance in the bull, whoſe fleſh is ſeldom choſen as a part of our diet. The fleſh of the female ſex is of a much more ſoluble nature, and ſufficiently fit for nouriſhment; but we commonly prefer the caſtrated ox, in which the fat is better mixed, and as more alkaleſcent the fleſh is more ſapid; and, unleſs it be from a very old animal, is generally to be preferred.

The

The chief difference of aliment in the ox kind, is that which appears between the old and young; the flesh of which last is named VEAL. This, as less dense, appears in our decoctions to be more soluble; and, in consequence of this, gives more of a gelatinous extract than the flesh of the adult: but it is not, therefore, more nutritious, as the gastric juice dissolves more than the water in our decoctions.

In young animals, the softer texture depends upon their being little difference between the muscular fibres and the cellular texture interposed between them. But this state is limited to a certain period of their growth. In veal it is when they are under two months old; for after that, and sometimes before it, the muscular fibre becomes more distinguishable, and the whole substance becomes less tender. Why veal gives a more gelatinous decoction than the older animal, we shall endeavour to explain hereafter.

OVIS, or the *Sheep* kind. These afford a dense substance, but less so than that of the ox kind. The difference of sex has the same effects here as in the ox kind; and more clearly here the flesh of the castrated animal is universally preferred. In this species, a circumstance to be taken notice of more than in any other, is, that the meat of this animal is more sapid, and seemingly more easily digested at a certain advanced period of its life, than when it is younger. Mutton under two years old, is less sapid and more difficultly digested than when it is several years older; and it seems to be in its greatest perfection at the age of five. This we ascribe in part to its alkalescency, greater at that period than when it is younger; but especially to the proportion in which the cellular texture filled with oil is to the solid fibres between which it is interposed. How far these circumstances take place, as some suppose at a period of life still more advanced, we cannot determine; but are persuaded it must have its limits, as the density of the solid increasing as life advances, may, at a certain period, very much diminish its solubility.

With regard to the Sheep kind, I hold that the same difference takes place between the young and old; that is, between LAMB and a full grown Sheep, as in the Cow kind between veal and beef.

With

With respect to Lamb, there is a particular management that may take place. If the lamb is allowed to suck its mother for six months or a little more, it becomes an aliment more nourishing and digestible than that of a lamb of the same age that had been weaned as usual at two months old.

CAPRA, or the *Goat* kind, is more dense and insoluble than that of the sheep, partly from its nature and partly from its food and exercise; so that even the flesh of the castrated kind is seldom admitted where any delicacy of aliment is studied.

SUS, the *Sow* kind. The peculiarity of the aliment taken from this genus consists in the quantity of oily matter which is here accumulated in the adipose membrane separately from the muscular parts, and that in greater proportion than in any other of the quadrupeds we employ in diet.

We have said above, that the oil of animals enters for a great part into the composition of the animal fluid, and is therefore a directly nutritious matter, and is further necessary for many purposes of the animal œconomy, to be laid up in the adipose membranes of the human species. We hold it, therefore, for certain, that the flesh of quadrupeds is a more nutritious, and a more proper aliment, as it contains a greater portion of oily matter, providing only that this is no more than the digestive organs can properly assimilate. In this respect we find the digestive powers, as observed above, to be very different in different persons. In some, the power of assimilating oily matter is very great, while in others it is extremely limited; and frequently in the same persons it is different at different times.

Whether from want of habit, from accidentally excited aversion, or from peculiarity of constitution, it is, that many persons of Scotland do not admit of pork or bacon in their diet, or digest it easily, I do not know; but certainly they are in greater number than in our neighbouring country of England. In those who do admit of it, it proves an easily digested and very nourishing food.

In

In this ſpecies there is the ſame difference as in others between the fleſh of the young and of the adult animal: and here the difference turns upon the pig or young animal being always leſs fat than that of the adult; and is therefore more digeſtible to many perſons who cannot digeſt the fleſh of the adult. As in other ſpecies alſo, there is ſome difference from the ſex; and the ſame difference in the caſtrated male and one that is entire: but it appears that theſe differences are leſs conſiderable than in any of the other ſpecies of quadrupeds. It is to be remarked alſo, that this ſpecies affords a food prepared in a manner that cannot be applied to any other; this is what is called BRAWN; a ſubſtance not readily ſoluble, but in ſuch ſtomachs as can diſſolve it, affording a great deal of nouriſhment. What is properly the Brawn, ſeems to conſiſt chiefly of the adipoſe membrane cloſely compreſſed; ſo that much of the oil is ſqueezed out, while the cellular texture remains ſo cloſely united as to form a tranſparent ſubſtance.

Cervus, the *Veniſon* kind; for to this genus the term Veniſon is moſt properly and ſtrictly applied. There are three ſpecies employed in the food of this country; viz. the Stag, the Fallow Deer, and the Roe. They are all wild animals and much exerciſed: they are, therefore, alkaleſcent; and though of a denſe ſubſtance, yet at a proper period of their age, and being of tolerable fatneſs, they are ſufficiently ſoluble and nouriſhing.

The Stag kind, as much exerciſed, are of the moſt denſe ſubſtance, and perhaps moſt alkaleſcent; and therefore moſt ſapid to many perſons: but as the Fallow-deer are moſt commonly better fattened, they afford a more ſoluble meat.

The Roebuck in its fleſh ſeems to be of the tendereſt ſubſtance; but as more rarely of much fatneſs, is perhaps leſs readily ſoluble.

Lepus, the Hare. As this animal is wild and much exerciſed, its fleſh is denſe and not eaſily ſoluble; but from its nature and exerciſe it is an alkaleſcent food, and is therefore more eaſily digeſted, and proves tolerably nouriſhing. As it is an object of chace, and often only killed after long exerciſe, it is therefore often much deprived of the oil that ſhould be in its

its cellular texture; and is then more difficultly digeſted than when it is ſuddenly killed.

Cuniculus, the Rabbit; a ſpecies of the ſame genus with the hare, but by nature, and from its being little exerciſed, it is of a very different quality; ſtill however of ſuch a denſe ſubſtance that we hardly ever employ the adult or older animal. The young are of a tender and white ſubſtance, and afford an aliment very readily digeſtible, and conſiderably nouriſhing.

The mention of the white fleſh of the rabbit leads me to take notice of what perhaps I ſhould have ſpoken before; the difference between the white and red meats, which was long ago marked by Dr. CHEYNE. This difference certainly depends upon the greater number of red arteries, and therefore upon the larger quantity of red globules interpoſed between the muſcular fibres in the one caſe than in the other. As it is probable that the red globules of the blood are conſiderably alkaleſcent, it will follow, that the red fleſh is more alkaleſcent than the white, agreeable to what we have ſaid above, that the ſubſtance of young animals, in which the white fleſhes are eſpecially found, is leſs alkaleſcent than that of the old. It is properly, therefore, that the white meats are conſidered as leſs irritating than thoſe of a red colour; abſtracting, however, from the effects in the ſtomach that may happen from their gelatinous nature ſpoken of above.

What conſideration from the quantity of red globules preſent in a portion of meat may ariſe with reſpect to the nouriſhment it may afford, is not eaſily determined, but we are perſuaded it may be a reaſon for ſuppoſing it to be greater in red meats than in white; and therefore a further reaſon for its being greater in old meats than in young.

I have now ſpoken of the quadrupeds employed as aliments in this country; and of thoſe of other countries I have omitted to ſpeak, both becauſe I have not experience enough to enable me to ſpeak of their particular qualities, and becauſe I expect the principles I have laid down with reſpect to thoſe I have treated of, may be applied to the ſtate of other animals, by any perſons who are acquainted more exactly with their nature and circumſtances.

There

There are certain general queſtions relative to the aliments taken from quadrupeds, particularly with reſpect to their preparation; but as the ſame queſtions relate to the other hot-blooded animals that we are yet to treat of, I ſhall delay the conſideration of theſe queſtions till I ſhall have conſidered the other ſet of hot-blooded animals, the Birds.

§ II. *Of* ALIMENTS *taken from* BIRDS.

The birds, like the quadrupeds, have two ventricles of the heart, and have a blood of nearly the ſame temperature with that of quadrupeds; and their fleſh, or their parts which we employ as aliments, are nearly of the ſame qualities as thoſe of the quadrupeds I have treated of: And therefore the general doctrine we have given with reſpect to the ſolubility, alkaleſcency, and nutritious quality, of thoſe, need not be repeated here; and it only remains for us to ſay, in what manner the aliment taken from the ſeveral genera and ſpecies of birds may be diſtinguiſhed.

Of the claſs of birds, according to the Linnæan ſyſtem, there are ſix orders; *Accipitres*, *Picæ*, *Gallinæ*, *Anſeres*, *Grallæ*, and *Paſſeres*. From the two firſt, as generally carnivorous animals, hardly any of our aliments are taken; but from the four other orders a great number are employed; and we ſhall ſay a little of the particulars.

I begin with the order of GALLINÆ, from which the greateſt number of aliments are taken.

The ſpecies moſt frequently employed is the GALLUS, GALLINACEOUS, the Cock and Hen more ſtrictly ſo called, or our common dunghill-fowl. Making allowance for the difference of age, the fleſh of this ſpecies being always white, is the moſt tender and the leaſt alkaleſcent, and therefore among the leaſt ſtimulant of animal food. On this account, the *chicken* or the young of this ſpecies, is moſt commonly allowed, when we are afraid of the irritation of animal food; and upon the general principle of the young of every ſpecies being the moſt ſoluble and leaſt alkaleſcent, the practice ſeems to be well founded. But as I obſerved above in the inſtance of veal, that the fleſh of young animals is ſometimes more difficultly digeſted

digeſted than that of the old, ſo the fact given us by Dr. BRYAN ROBINSON is an inſtance of it in the caſe of chicken: and though this cannot be ſuppoſed to be a common caſe, yet I think I have met with ſome other inſtances of it.

In this ſpecies, the difference depending on age is ſufficiently remarkable; ſo that after a year old the fowls of this ſpecies, according to the advancement of their age, are conſtantly becoming proportionably more difficultly ſoluble.

Before a year old, the difference ariſing from ſex is not very remarkable; but after that period it becomes more and more conſiderable.

In this ſpecies alſo, the effects of caſtration are conſiderable; and the *capon* and *poulard* become readily fatter, and retain their tenderneſs much longer, than the cock or hen whoſe genitals are entire.

In preparing this ſpecies for our tables, a difference of management often takes place: and though the barn-door fowl, as it is called, is certainly an unexceptionable aliment, yet it appears to me that a crammed fowl, as it is more alkaleſcent, ſo it is more ſapid and tender; and for what I can perceive, a ſufficiently innocent food.

Of this ſpecies many varieties are marked; but they appear to differ only in their external form, and I have not yet found that they give any difference of aliment.

Very much of the ſame nature with the ſpecies we have been ſpeaking of, is the NUMIDA, Linn. or *Guiney Hen*; and this taken at a certain age, affords an aliment as tender and as little alkaleſcent as the ſpecies laſt mentioned.

We are much diſpoſed to ſay the ſame of the GALLO PAVO or *Turkey*; and if any difference is to be aſſigned it is very little, and perhaps only in its being ſomewhat leſs ſoluble and more alkaleſcent.

The only other domeſtic fowl belonging to this head, is the PAVO or *Peacock*; and this taken in whatever ſtate, is to a conſiderable degree leſs ſoluble than any of the preceding

ſpecies. Although vanity might have formerly ſet it upon the Roman tables, it is hardly ever, except in its very youngeſt ſtate, admitted to the tables of modern Europe.

Theſe are the domeſtic ſpecies of the gallinaceous order. Of the wild kind, the firſt to be mentioned is the PHEASANT; which, from its nature and greater exerciſe, is leſs ſoluble than any of the domeſtic fowl: and though, from the ſame cauſes, it is more alkaleſcent, this does not render it, except in its very young ſtate, very readily digeſtible.

Next to the pheaſant, I put the PARTRIDGE and QUAIL kind. Of the former there is a great variety; but how far they differ as aliments, I am not exactly informed. I am, however, perſuaded that it is not in any conſiderable degree. The partridge of this country is of a much tenderer ſubſtance than the pheaſant: and though alſo leſs alkaleſcent than that, it is from its exerciſe more ſo than the domeſtic fowl. From thence its qualities as an aliment may be readily underſtood, as may alſo thoſe of the Quail, which are very nearly the ſame.

The partridge and quail are put by LINNÆUS under the genus of *Tetrao*: and agreeable to the rules of natural hiſtory, they may be ſo placed; but certainly with a view to their qualities as aliments, they may be properly diſtinguiſhed.

The TETRAO UROGALLUS, and the other *Tetraones* pedibus hirſutis, are of different qualities from thoſe of the partridge kind or the Tetraones pedibus nudis.

Of the Tetraones pedibus hirſutis we have four ſpecies in Scotland. *The Cock of the Mountain*, a ſpecies formerly frequent in this country under the name of the Capercailzie, is now almoſt entirely loſt. The other three ſpecies are, the *Black Cock*, or the *Tetrao Tetrix* cauda plena: the third is the *Red Game*, not known to LINNÆUS, and is I think the *Atagas* of BUFFON: and the fourth is the *Ptarmigan*, which I take to be the *Tetrao lagopus* of LINNÆUS and the *Gelinotte d'Ecoſſe* of Mr. BUFFON.

All theſe ſpecies ſeem to have a common quality. The three firſt are naturally of a tender ſubſtance; and they are ſtill

ſtill more ſo from their alkaleſcence, which is conſiderable. From both circumſtances, they are ſapid and agreeable to moſt perſons, but at the ſame time muſt be conſidered as a conſiderably ſtimulant food. The Ptarmigan is a drier food, leſs tender and leſs ſapid than the other three ſpecies.

A ſecond order of the birds affording aliments is that of the ANSERES, or the Water-fowl.

The moſt noted for its bulk and figure is the CYGNUS or Swan; but its fleſh is firm and ſolid, and of ſo difficult ſolution and digeſtion that it is little employed as a food.

The ANSER *Domeſticus* or Tame Gooſe, is of qualities approaching to that of the ſwan; but as leſs exerciſed, and living much on vegetable aliment, is of a more tender ſubſtance: but was it not for its alkaleſcency, it would be ſtill a ſubſtance of difficult digeſtion.

Upon this account the ANAS *Domeſtica*, as living more upon animal food, is ſtill more alkaleſcent and of more eaſy ſolution. Of both theſe ſpecies, the young animals, of a more viſcid texture, are more ſlowly digeſted than thoſe ſomewhat more advanced. Of each ſpecies alſo there is a tame and a wild kind; and the latter, as of more alkaleſcency, are more eaſily digeſted than the others.

Of this anſerine tribe there are a great number beſides thoſe enumerated that afford aliment, and are much of the ſame qualities with thoſe already mentioned. With reſpect to moſt of them, as they are ſea-birds and live upon fiſhes, they are more alkaleſcent, and very often on that account are tender and of eaſy digeſtion. They are commonly of a ſtrong odour, and of a rank fiſhy taſte, and from thence to many perſons highly diſagreeable; but to others, to whom their odour is not ſo offenſive, their ſapid and tender fleſh is highly agreeable, and generally proves of very eaſy digeſtion. Theſe circumſtances are particularly applicable to the peculiar Scottiſh food, the SOLAN Gooſe; which to many indeed even of this country is highly offenſive and entirely rejected, whilſt to many others it is in the higheſt degree of favour.

The

The next order of birds to be taken notice of is that of the GRALÆ, which comprehends a great number of ſpecies of very different qualities; and I cannot find that any one quality can be found in common to the whole order. As they are birds of more or leſs exerciſe, they are accordingly of a firmer and leſs ſoluble ſubſtance; and as many of them are ſea-birds, living very entirely upon fiſhes, they are conſiderably alkaleſcent, and in their flavour and taſte come near to the nature of the anſerine kinds, who reſort to the ſame places and live upon the ſame diet.

The effects of exerciſe on the particular parts of an animal appears in birds of this tribe. The WOODCOCK and SNIPE, in which the muſcles of the breaſt, much exerciſed in flying, are of a firm and leſs ſoluble texture; while the legs, little exerciſed, are more tender.

We are now come to ſpeak of the fourth order of birds affording aliments, which is that of the PASSERES; a very numerous tribe, to which as alimentary we can aſſign no common quality: and we have too little experience of particulars to diſtinguiſh the variety that may occur here.

There is one genus among thoſe moſt frequently uſed that ſeems to have peculiar qualities different from moſt of the other *paſſeres*. This is the COLUMBA; a genus of which ſeveral ſpecies might, I believe, be uſed if we could obtain them in their young ſtate; but we are only well acquainted with what is in common uſe, the *columba domeſtica*. We take this in its very young ſtate before it has had any exerciſe, and in which ſtate only it is ſufficiently tender; but nature, independent of food or exerciſe, has made it of a very alkaleſcent quality, from whence it is tender; and even in its youngeſt ſtate, from the ſame quality, it is a heating food.

Of the other paſſeres I can only ſay, that almoſt all of them, when they are taken in their fattened ſtate, are ſufficiently tender and eaſily digeſted; and according to their diet on grain or worms, are more or leſs alkaleſcent.

I have thus finiſhed what I had to ſay of aliments taken from the claſs of birds; and muſt here take notice of a very particular

particular kind of aliment afforded, and only afforded, by this claſs; and that is EGGS. As the ſubſtance of theſe is what affords a matter peculiarly ſuited to the formation of the young animal, it muſt be conſidered as containing a large proportion of nutritious matter: ſo any quantity of it taken into an animal body muſt be ſuppoſed to introduce a large proportion of ſuch matter.

This we might ſuppoſe to require no preparation in the adult body it is taken into, to fit it for the purpoſe of nouriſhment: but this does not happen to be the caſe; for we, for the moſt part, take into the human ſtomach the white of egg in its coagulated ſtate; and even when taken in in its liquid ſtate, the firſt change that happens to it there is its being coagulated: ſo that in all caſes it muſt be again diſſolved by the peculiar power of the gaſtric juice, probably for the purpoſe of its being mixed with other matters neceſſary to conſtitute the proper animal fluid.

Digeſtion is a myſterious buſineſs, which we do not, in all its circumſtances, well underſtand; and therefore we cannot at all explain the ſingular fact of the white of egg even in very ſmall quantity, whether in its liquid or coagulated ſtate, proving conſtantly the occaſion of much ſickneſs in the ſtomach of certain perſons, while in moſt part of other men it is an agreeable and readily digeſted food. It is indeed ſurpriſing what a quantity of egg may be digeſted by ſome perſons; but I am perſuaded that in moſt perſons this power is very much limited, and that a ſmaller bulk of this than of any other food will ſatisfy and occupy the digeſtive powers of moſt men. At the ſame time, I muſt obſerve, that egg ſeems to be a leſs alkaleſcent food than almoſt any other animal ſubſtance, and during its digeſtion to be leſs ſtimulant *.

Whether egg has more or leſs diſpoſition to render the body plethoric than other ſpecies of animal food, I cannot, from want of experiment, properly determine.

With

* The ſubſtance, however, when it is not applied to its proper function of nouriſhing a chick, is liable, while yet in the ſhell, to a peculiar putrefaction; and when eaten in that condition, is highly offenſive to the ſtomach; and when it is to a high degree, it becomes very noxious.

With reſpect to the particular qualities of the eggs of different birds, and whether they are in any caſe conſiderably different, I cannot clearly determine; but I am diſpoſed to think they are very little ſo: and I am certain that in many inſtances the peculiar odour and taſte of the fleſh of the bird is in no degree communicated to their eggs. For example, in certain ſea-fowl, whoſe fleſh is of the rankeſt odour and taſte, their eggs are as free from taſte and ſmell as the eggs of our domeſtic fowl. Even in the latter, we can obſerve ſome difference in the taſte of the yolks, and in the denſity of the whites; which ſeems to depend on the food the animal lives on. But theſe differences are very ſlender: and whether other cauſes may give like differences in the eggs of different birds, I cannot poſitively aſſert; but in certain different birds, the colour of the yolks and the denſity of the coagulated whites, are ſomewhat different from one another. The yolks, however, are ſtill yolks, and the whites are ſtill ſo much of the common nature of whites, that their difference as aliments is hardly to be aſſigned.

§ III.

§ III. *Of* ALIMENTS *taken from the Claſs of* AMPHIBIA.

By LINNÆUS this claſs is divided into three orders; of REPTILES, SERPENTES, and NANTES: but we are here to take notice only of the two firſt; which in their ſtructure, œconomy, and qualities, have a manifeſt affinity with one another, and are very different from thoſe of the Nantes. Theſe, though they have ſome ſimilarity in their œconomy with the Reptiles and Serpents, are ſo much otherwiſe of the nature of fiſhes, that they are, in every conſideration of them as aliments, to be ſeparated from the former and joined with the latter.

Of the Reptiles, the moſt noted, and firſt to be taken notice of, upon account of its being ſo much eſteemed as an aliment, is the TORTOISE. The fleſh of the ſea-tortoiſe, the only one I am acquainted with, is a white meat very much reſembling that of the young quadrupeds; and from this we judge that the difference between the nouriſhment afforded by the one and the other cannot be great. It appears from the experiments of Mr. GEOFFROY, that the tortoiſe affords leſs gelatinous matter in ſolution, and leſs volatile alkali in diſtillation, than the fleſh of quadrupeds, and conſequently in equal quantities may be ſomewhat leſs nouriſhing and ſtimulant: but as it affords a gelatinous ſolution, and is upon this account leſs perſpirable, it may be ſtill very conſiderably nouriſhing, and the gelatinous parts of its ſubſtance may be particularly ſuch.

The fleſh of FROGS, with the uſe of which we are little acquainted in this country, ſeems, from the analyſis of Mr. GEOFFROY, to be both in ſolution and diſtillation of the ſame qualities with that of the tortoiſe, though, as leſs gelatinous, to be therefore leſs nouriſhing. But however that may be, their qualities are in nowiſe peculiar; and I cannot find any foundation for introducing them into bouillons or broths in that nice proportion in which they are frequently preſcribed in France.

The

The qualities of the LACERTA *Guana*, though frequently employed in the Weſt Indies, we are little acquainted with; but ſuppoſing their qualities to be much the ſame with that of the other reptiles, though the lacerta was omitted in my catalogue, it ſeemed proper to mention it here.

Of the SERPENTES, as alimentary, I am acquainted only with the common VIPER, or *Coluber Berus* of LINNÆUS. The fleſh of this has been ſuppoſed to be of peculiar qualities; but I cannot find any foundation for this. The fleſh of the viper gives out in decoction the ſame ſubſtances as the reptiles above mentioned, and very much of the ſame qualities as the decoctions of the quadruped and bird kind.

In diſtillation, the viper gives out a quantity of volatile alkali; but not of any different qualities, as formerly ſuppoſed; nor, as Dr. MEAD imagined, in any greater quantity or proportion than what is obtained from moſt other animal ſubſtances. That the viper, therefore, has any very peculiar qualities as an aliment, we do not perceive; and that they have any peculiar powers as medicinal, we cannot find the ſlighteſt foundation for ſuppoſing. We muſt therefore conſider the ſuppoſition of either its alimentary or medicinal qualities, as a mark, among many others, of the weakneſs and folly of the ancients, and equally of their modern followers.

§ IV.

§ IV. *Of* ALIMENTS *taken from the Claſs of* FISHES.

On this ſubject writers commonly begin with marking fiſhes as different according as they inhabit rivers, freſh-water lakes, or ſalt waters: but I cannot find any foundation for the diſtinction, as I cannot find any ſteady general character to be given to them as they inhabit thoſe different waters, or any diſtinguiſhing quality that does not in ſome inſtances take place in each of them.

We are therefore to conſider fiſh in general as diſtinguiſhed from the three claſſes of animals already treated of; which we ſhall generally ſpeak of under the appellation of Meats; and the difference here is very conſiderable.

When we began to ſpeak of aliments as taken from quadrupeds and birds, we remarked that the ſimilarity of ſubſtance and œconomy in thoſe animals to that of man, gave little difficulty in ſuppoſing that the former might be alimentary with reſpect to the latter; but here, with reſpect to fiſhes, there is no ſuch analogy to direct us: and it would be difficult to determine, *a priori*, that the ſubſtance of fiſhes muſt prove alimentary to man. They have indeed ſeveral properties in common with other animal ſubſtances, as that of yielding a volatile alkali in the firſt part of their diſtillation, and that of their being putreſcent. But theſe circumſtances would hardly be enough to point them out as alimentary ſubſtances to man; and therefore the proof of this reſts entirely upon experience, which has ſhown them to have been at all times, and in every part of the earth, employed ſucceſsfully as aliments. It is ſaid, that in ſome parts of the earth there are people who live entirely upon this kind of aliment; and it is certain that with many people it is the chief part of their food. In ſuch caſes it appears to be perfectly ſufficient for all the purpoſes of the human œconomy; and whether it is in any caſe inſufficient or leſs fit for theſe purpoſes, we ſhall conſider preſently, when we ſhall have firſt conſidered the differences that appear

pear between the ſubſtance of theſe and that of the hot-blooded animals.

There is certainly ſome difference in the firmneſs of the ſubſtance of different fiſhes; but it is never ſo conſiderable as it is in the three claſſes of animals above treated of: and it is curious to obſerve, that although fiſhes are long-lived animals, yet the difference of firmneſs of texture at different ages is ſeldom remarkable. It is alſo to be remarked, that although the ſubſtance of fiſhes is putreſcent, and at length becomes entirely putrid, yet their putrefaction is with different circumſtances from that of the hot-blooded animals. This, however, has not yet been ſtudied by the chemiſts; and I am unable to ſay what are the different ſtates of it in its progreſs, and therefore how far it affects them as an alimentary matter. I cannot truly perceive that it renders it more ſoluble or much more irritating to the ſyſtem, as it does in the caſe of the meats above treated of.

There is, however, a caſe in which certain fiſhes, independent of the ſtate of their putreſcency, give a ſingular irritation to the ſyſtem. It is during their digeſtion in the ſtomach that certain fiſhes are ready to occaſion a conſiderable efflorescence upon the ſkin; ſometimes in certain parts of it only, but ſometimes over the whole body; ſometimes with a conſiderable febrile diſorder, but at other times with very little. It is ſeldom of long duration, and commonly paſſes away by the time that the matter is entirely digeſted and paſſed out of the ſtomach. In ſome caſes I have had it immediately removed by a vomit, bringing up the contents of the ſtomach.

By all this it appears, that the phenomenon depends upon an operation upon the ſtomach, and not upon any matters being mixed with the blood: and it may be a queſtion, Whether it depends upon an operation upon the nerves of the ſtomach communicated to the ſkin, or upon the operation of the ſubſtance of fiſh determined more particularly to operate upon the ſurface of the body?

This leads to a queſtion, How far the ſubſtance of fiſh is an aliment more or leſs perſpirable than that taken from the hot-blooded animals? I took notice above of SANCTORIUS's opinion

nion of the perſpirability of mutton, and of Dr. KEILL's opinion of the imperſpirability of oyſters, which are a ſubſtance ſomewhat ſimilar to that of fiſhes; and though I obſerved that DE GORTER's experiments had not confirmed either of theſe facts, yet I allowed that the matter might, and deſerved to be, a ſubject of farther inquiry. By what experiments I have been able to make, it appears to me that the ſubſtance of fiſhes is an aliment ſomewhat leſs perſpirable than that of meats.

In the compariſon of theſe two kinds of aliment, the circumſtance that eſpecially demands our attention, is the quantity of nouriſhment they ſeverally afford. The common opinion is, that fiſh afford a weaker nouriſhment than meat does: and Dr. HALLER found himſelf weakened by a fiſh diet, and alleges that perſons are generally weakened by a Lent diet; and the obſervations of PECHLIN ſeem particularly to confirm this. But there may be much fallacy in theſe obſervations, as the weakneſs alleged may be owing more to the quantity of vegetable aliment employed at the ſame time than to that of the fiſh. I have known ſeveral inſtances of perſons who felt no weakneſs from a Lent diet when a great deal of fiſh was taken; and we have ſeveral inſtances of villages inhabited almoſt only by fiſhers, and who therefore live very much upon this ſort of aliment, but in whom no diminution of health or vigour appears. It will therefore be very doubtful if fiſh afford much leſs nouriſhment than meat does; and I am perſuaded that, if any, the difference is very inconſiderable.

Whilſt I make theſe obſervations on fiſhes as an aliment in general, I wiſh I could diſtinguiſh the different qualities of particular fiſhes: but I find it difficult to ſpeak clearly or poſitively upon the ſubject, as no experiments that I know of have been made to determine the matter. It appears that ſome difference will ariſe from the difference of texture, and that the tenderer and more gelatinous kinds, as occurs eſpecially in the cartilaginous fiſhes, will be more eaſily digeſted, and more nouriſhing, than thoſe of a firmer and drier texture. It has been alleged, that fiſhes, as having leſs oil in their ſubſtance than our meats have, ſhould be therefore leſs nouriſhing; and this is alleged with ſome probability: but how far it goes, it is difficult to determine; for in many fiſhes,

fiſhes, the quantity of oil in their ſubſtance is inconſiderable: and I would venture to lay it down as a truth, that the oily fiſhes give an aliment leſs eaſily digeſted, more irritating to the ſyſtem, but at the ſame time more nouriſhing than the leaner. We ſeem to have examples of this in eel, ſalmon, and herring: and with regard to the laſt, I might have obſerved, when ſpeaking of the nouriſhment afforded by fiſh in general, that our herring-fiſhers, living for ſome length of time upon this aliment alone, ſuffer no loſs of ſtrength, and ſeem rather always to be much fattened by this diet.

I can hardly ſay more on the alimentary qualities of fiſhes, not having had the opportunity of experience with reſpect to the great number and variety that are employed as aliments; I can find very few experiments that have been made to aſcertain their different qualities: and it appears to me that they have been choſen by their taſte rather than by any proper experience of their nutritious qualities.

From ſome experiments, it appears that the aliment taken from fiſhes is leſs perſpirable than that taken from the hot-blooded animals; but I believe that more experiments will be neceſſary to aſcertain this matter more exactly.

§ V.

§ V. *Of* ALIMENTS *taken from* INSECTS.

Of this numerous claſs very few are employed as aliments in this part of the world; and I can hardly take notice of any but certain of the CRUSTACEA, as the LOBSTER, CRAB, PRAWN, and SHRIMP, which are thoſe only that are ſeen very frequently upon our tables. The Cruſtacea are indeed of much greater variety; and perhaps many of them, in other parts of the world, may be uſed in diet: but they neither come within my plan, limited to Britiſh aliments, nor have I any proper acquaintance with thoſe others.

With reſpect to the Lobſter and Crab, I am of opinion that they hardly differ in any quality from one another; and that it is only the more elegant appearance of the lobſter that makes it appear much more frequently than the crab upon our tables.

The ſubſtance of both gives out in decoction a conſiderable quantity of matter: but this does not determine the quantity of nutritious matter to be greater than what may be extracted by the gaſtric fluid from other ſubſtances which do not give out ſo much in decoction; and the ſmaller proportion of volatile alkali that is obtained from their entire ſubſtance or from their extract, makes me preſume upon their containing leſs of animal ſubſtance than the fleſh of quadrupeds, birds, or even of the amphibia.

With reſpect to them as aliments, we are diſpoſed to conclude them to be much of the nature of the moſt part of fiſhes. They particularly approach to the nature of many of theſe, in being without oil, or in having it in very ſmall proportion; and therefore, in my opinion, affording leſs nouriſhment. They appear to be of more difficult digeſtion than the moſt part of lean fiſhes.

With

With reſpect to their digeſtion there is ſomewhat peculiar often happens, as I have known ſeveral inſtances of perſons who could not take even a very ſmall quantity of lobſter or crab without being affected ſoon after with a violent colic, and ſometimes with that ſame efflorescence on the ſkin which, as we ſaid above, often happens from eating ſalmon or herrings. In both caſes, I believe it happens eſpecially from the idioſyncraſy of particular perſons; and how difficult that is to be explained, will appear from what we ſaid above on the ſubject of Eggs.

§ VI.

§ VI. *Of* ALIMENTS *taken from the Claſs of* WORMS.

Several of this claſs are uſed as aliments, but not many in proportion to the number of ſpecies which the claſs comprehends. I ſhall mention thoſe only which come upon our tables here; which is the circumſtance that has given me the opportunity of being acquainted with them.

They are chiefly the animals included in the TESTACEA. The Bivalves afford ſeveral; the chief of which is the OYSTER. This, in its freſh and raw ſtate, is of eaſy digeſtion; but in its boiled or roaſted ſtate more difficult, and often very much ſo. The oyſter ſeems to be conſiderably nouriſhing, and it may be more ſo, becauſe it is not readily perſpired. Dr. JAMES KEILL in his experiments, found oyſters not only difficultly perſpired, but that they even prevented the perſpiration of other aliments. SANCTORIUS may be ſuppoſed to ſay the ſame thing, *Aph.* 438.; but it ſeems to be difficult to make any thing of his opinion, when he reckons the Oſtracea among the flatum gignentia. DE GORTER poſitively aſſerts, that in his experiments the imperſpirability of oyſters did not appear: but from ſome trials I have made, I am diſpoſed to judge, that oyſters are leſs readily perſpired than ſome other foods.

The other Bivalves chiefly employed in this country, are the MUSSEL and COCKLE; neither of them, as being of a firmer ſubſtance, are ſo eaſily digeſted as the oyſter; but in other reſpects they are ſeemingly of the ſame qualities.

The muſſel is reported to have, upon ſeveral occaſions, produced very noxious effects, and given occaſion to a ſuſpicion of its being, in certain circumſtances, poiſonous, or of its carrying a poiſonous matter along with it into the ſtomach. As, however, we do not meet with ſuch accidents in this country, though the muſſel is very frequently and largely employed in

our diet, I am at a loſs to judge of this matter. No writer that I know of has determined the nature of this poiſon, or of the ſtate of the muſſel that renders it upon occaſion noxious; and I am ready to ſuſpect that moſt of the inſtances of this diſorder imputed to muſſels, depend either upon an unuſually large quantity being taken, or upon an idioſyncraſy in certain perſons, rendering them liable to be affected by muſſels, in the ſame manner as we have ſaid certain others are by ſalmon, herring, and lobſter.

Of the Univalve Teſtacea, the chief is the SNAIL, COCHLEA *pomatium*. This is of a tender ſubſtance, and therefore eaſily digeſted; and from its gelatinous ſtate it is ſuppoſed to be very nouriſhing. I verily believe it to be ſo; but in what proportion is not aſcertained. They are commonly employed upon the ſuppoſition of their nutritious qualities in caſes of emaciation; and they have been often, in that view, employed in caſes of hectic fever.

In materia medica writers, they are conſtantly mentioned as refrigerant; but nothing can be a greater miſtake, for they are ſtill animal ſubſtances; and nothing of this kind can be refrigerant, though ſome of them may be leſs heating than others.

As all the animals found in univalve ſhells which are employed as aliments, are of the ſame genus, I believe what we have ſaid of the ſnail may be applied to all the others. We muſt own, indeed, that we have not had a proper opportunity of obſerving the difference: but, in the mean time, are perſuaded that it is very inconſiderable.

THE COOKERY OF MEATS.

We have now finiſhed our enumeration of the aliments taken from both vegetables and animals; but in order to judge ſtill more exactly of their effects taken into the body, it will be proper to conſider, as well as we can, what changes they undergo by the cookery they are ſubjected to before they are taken into the ſtomach.

This conſiſts chiefly in the application of heat; and with very few exceptions, this is applied more or leſs to the whole of

of animal ſubſtances. It is, indeed, in the buſineſs of aliments by this eſpecially, that man is diſtinguiſhed from all other animals, who take food as nature offers it; and at leaſt, I know of none of the brute creation that practiſes any art of preparing their food by ſubjecting it to heat. If they uſe any food ſo prepared, it is only ſuch as has been prepared, by the artifice of men.

How far any part of our vegetable aliments is neceſſarily ſubjected to heat is not certain; and I do not recollect any ſpecies of vegetable ſubſtance that may not be taken in its raw ſtate by men of tolerable health and vigour. But, at the ſame time, the whole of them are upon occaſion ſubjected to a preparation by heat; and mens being directed by inſtinct ſo univerſally to this practice, implies, that in many caſes it is proper, and attended with ſome advantages.

Theſe advantages ſeem to be, in the firſt place, that the moſt part of vegetable ſubſtances are thereby rendered more ſoluble in the human ſtomach. The only doubt that can ariſe with regard to this is in the caſe of vegetable ſubſtances, to which, in their crude ſtate, a boiling heat is immediately applied, and thereby in many of them a coagulation is produced; in conſequence of which they ſeem to be rendered leſs ſoluble in water than they were before: but this does not ſeem to have any effect on their ſolution in the ſtomach. Whether the difficult ſolution be obviated by ſome degree of fermentation that neceſſarily takes place in the ſtomach, or by the powers of the gaſtric fluid, it is not neceſſary to determine, as it remains certain that the action of heat ſeparates in ſome meaſure the ſmall particles of bodies; and thereby renders them more readily ſeparable by the ſolvent powers of the ſtomach.

In the ſecond place, the application of heat ſeparates and diſſipates the volatile parts of vegetable ſubſtances, which are ſeldom of a nutritious nature, and, in many caſes, have a tendency to prove noxious.

In the third place, the application of heat to a certain degree extricates and diſſipates a conſiderable quantity of air that in the natural ſtate of vegetables is always fixed in their ſubſtance; and it is probably in this way eſpecially that heat

contributes to the dividing and looſening the coheſion of the ſmall parts of vegetable ſubſtances. It is certainly in this way, by diſſipating a large portion of their air, that vegetables are rendered leſs liable to fermentation, and leſs liable to produce that flatulence which is upon occaſion ſo troubleſome in the ſtomach and inteſtines. On what occaſions eſpecially theſe preparations by heat are proper and neceſſary, we have frequently hinted above on the ſubject of particular aliments: and it is only neceſſary to obſerve furtheir, that as the heat may be employed in two ways, either in a humid or in a dry form, we are of opinion, that the former is always better ſuited than the latter to all the purpoſes above mentioned.

The cookery of animal ſubſtances alſo conſiſts chiefly in the application of heat. It is, indeed, poſſible that ſome practices, previous to that application, may be conſidered alſo as parts of cookery, particularly ſalting, drying, and pickling. Theſe practices, however, are merely uſeful for the purpoſes of domeſtic œconomy, as preſerving meat from putrefaction, before it be ſubjected to heat, for a longer time than it could be preſerved without ſuch means.

We are, at the ſame time, of opinion, that theſe practices can never increaſe the nutritious quality of meat, or render it even of more eaſy digeſtion. Drying certainly brings the ſolid parts of meat more cloſely together, which muſt render it of more difficult ſolution. The addition of ſalt which ſtimulates the ſtomach, may ſeem in ſome caſes to promote digeſtion: but this muſt be when the ſalt is added in ſmall quantity, and when the meats preſerved by it are taken in moderate quantity only. For when meats have been long ſalted they are hardened, and rendered in proportion leſs ſoluble in the ſtomach; and a large quantity of ſalt accompanying them is certainly hurtful to the ſyſtem.

There is one preparation of animal food which is made without any addition, and that is by its being kept for ſome time before it is ſubjected to cookery, longer or ſhorter according to the ſeaſon and nature of the meat, but always till it has made ſome advance towards putrefaction. The tendency to this ſeems to take place from the moment that life is extinguiſhed in the animal; and that the allowing it to take place

to

to a certain degree renders the meat more eaſy of ſolution in the ſtomach; and if the putreſcency is in a moderate degree only, it does not ſeem to hurt the nutritious quality of the meat. How far the putreſcency may be properly carried, I cannot determine; but certainly it may be different according to the conſtitution of the perſon.

There are perſons who ſeem to ſuffer no inconvenience from meats, though in a very putreſcent ſtate: but although there are perſons who can digeſt tainted meats, that is, meats having the taſte and odour which we know to ariſe from putreſcency, yet I know many others in whom the digeſtion is much diſturbed by the ſmalleſt quantity of meat tainted by putreſcency. But however all this may be, we are clearly of opinion that the keeping of meat for the purpoſe mentioned above ſhould never go far; for very certainly every advance in meats towards putreſcency, renders them more ready to increaſe the ſpontaneous tendency of the animal fluids to that ſtate which we take to be always hurtful to the human conſtitution, as it both favours the coming on of diſeaſes, and aggravates their ſymptoms and danger when they do come on.

We come now to conſider what is properly the cookery of animal ſubſtances, or the preparing them by the application of heat. This is of two kinds, as it is applied in a humid form in *boiling* and *ſtewing*; or in a dry form, in *roaſting*, *broiling*, and *baking*.

Boiling is properly the expoſing of meat to the heat of boiling water, while it is immerſed in this for ſome length of time. By this joint application of heat and moiſture, the texture is certainly rendered more tender and more ſoluble in the ſtomach; and it is only in this way that the firmer parts, as the tendinous, ligamentous, and membranous parts, can be duly ſoftened, and their gelatinous ſubſtance duly extracted.

With reſpect to the parts of animal fleſh that are of a tenderer texture, the effects are different according to the degree of boiling that is applied to them. A moderate boiling may render their texture more tender without much diminution of their nutritious quality; but if the boiling is extended to extract

tract every thing ſoluble, the ſubſtance remaining is certainly leſs ſoluble in the ſtomach, and at the ſame time much leſs nutritious. But as boiling extracts in the firſt place the more ſoluble, and therefore the ſaline parts; ſo the remainder, after boiling, is in proportion to the length of that leſs alkaleſcent and leſs heating to the ſyſtem.

Boiling is commonly practiſed in open veſſels, or in veſſels not very cloſely covered: but it may be practiſed in *digeſters*, or veſſels accurately and tightly cloſed; and in ſuch veſſels the effects are very different from what they are in open veſſels. As we can hardly employ any other degree of heat than that of boiling water, the water in the digeſter is never made to boil, ſo there is no exhalation of volatile parts; and although the ſolution is made with great ſucceſs, and may be to any degree required, yet if that is not carried very far, the meat may be rendered very tender, while it ſtill retains its moſt ſapid parts; and this kind of cookery will give always the moſt deſirable ſtate of boiled meat.

Boiling in the ordinary way may be conſidered as different according to the proportion of water applied. If a ſmall quantity only is applied, and the heat in a moderate degree is continued for a long time, this is STEWING, and has the effect of rendering the texture more tender, without extracting much of the ſoluble parts; and this, therefore, leaves the meat more ſapid, and ſufficiently nouriſhing.

The other application of heat is in a dry form, or when the meat ſubjected to it is in a dry form, or nearly ſo; at leaſt it is without the addition of water or other fluid that may diſſolve any part of its ſubſtance. This application of heat is again of two kinds, as it is in cloſe veſſels or as it is expoſed to the free air.

The firſt is BAKING; and though commonly in this practice the cover of the meat is only of paſte, any conſiderable exhalation is prevented, and the retention of the juices under the application of heat renders the meat more tender: and in all caſes when the heat applied looſens, and in ſome meaſure extricates, the air without exhaling it, the ſubſtance is rendered more tender than when with any other application an exhalation is allowed.

In

In BROILING an exhalation takes place; but as the heat of a naked fire is more nearly applied, the outer ſurface is in ſome meaſure hardened before the heat penetrates the whole, and thereby a great exhalation is prevented, while the whole is rendered ſufficiently tender: but this kind of cookery is eſpecially ſuited to meats that are choſen to be eaten a little rare.

Nearly a-kin to this dreſſing is that of FRYING: but as in this the meat is cut into thin ſlices, and laid in a veſſel which is interpoſed between the meat and the naked fire, the heat is applied more equally to the whole ſubſtance. But as the part of the meat lying next to the bottom of the veſſel would be ſuddenly hardened by the heat, it is always neceſſary to interpoſe ſome fluid matter. When this, as moſt commonly it is, is of an oily matter, as a ſtrong heat applied to ſuch matter is ready to render it empyreumatic, or at leaſt leſs miſcible with the fluids of the ſtomach; ſo all fried meats are leſs eaſily digeſted than thoſe of any other preparation, except that ſometimes the ſame may happen to baked meats, to which an oily matter, and that only, is added to avoid the too drying heat. It is obvious that the preparations of ſtewing and frying may be frequently joined together; and according to there being more or leſs of the one or other, the effects may be judged of.

The manner of applying heat yet to be mentioned is the frequent one of ROASTING. In this, as by a proper artifice an equal application is taken care of, the effect of heat in rendering the meat more tender is certainly obtained; and though a conſiderable exhalation is made, it is almoſt only of a watery humidity. This indeed would take place to a very great degree, and render the meat again more inſoluble, were it not that large maſſes only are ſubjected to this operation, and that thereby the outer ſurface is firſt condenſed, and prevents the exhalation from the interior parts. At the ſame time, an oily matter is commonly and repeatedly applied to the outer ſurface, which prevents both much exhalation and any great hardening of the outer ſurface, till the heat has penetrated the whole, and rendered it ſufficiently tender. From all which the effects of roaſting, and the proper conduct of it, may be underſtood.

Having

Having thus explained as well as we can the chief parts of cookery, and their effects as consisting in the application of heat, we have only to observe, that meats, as presented upon the table, differ further only, by the difference of sauces, or humid matters, which are employed to obviate the dryness of meats, and to render them more agreeable to the taste.

The sauces have for their basis oily matter or strong gelatinous extracts from other meat; and both these rendered more agreeable by the admixture of some other alimentary matters, and more poignant by the addition of various condiments: the effects of which in the stomach and mass of blood will be understood from what we are presently going to say of them.

CHAP.

CHAPTER III.

OF DRINKS.

UNDER the titles of Aliment, Food, or Meat, I comprehend every thing, whether ſolid or liquid, that can ſerve for ſupplying the ſolid matter of the human body; and under the title of Drink, I comprehend every liquid that is fit to ſupply the watery parts both of the ſolids and fluids.

How much water enters into the compoſition of the fluid, and even the ſolid, parts of our bodies, is well known; and it is equally well known that the ſame water by various means, is in continual diſſipation and waſte, and conſequently that a conſtant ſupply of ſuch liquid is abſolutely neceſſary to the ſupport of the ſyſtem. That ſuch a ſupply may be duly made, nature has given the appetite of thirſt, which leads to the taking in of drink.

The drinks we take in are ſeemingly different matters; but the ſupply mentioned may be made by pure elementary water alone; and that all the drinks which ſupply the neceſſary liquid, do it only by the quantity of elementary water they ſeverally contain, will, we ſuppoſe, be readily allowed. Our drinks, therefore, may be conſidered as of two kinds; one conſiſting of water alone, ſuch as nature affords it; and another whoſe baſis or principal part is ſuch natural water, but with certain additions made to it by nature or art.

SECT.

SECT. I.

Of SIMPLE WATER.

THIS, ſo far as I know, is the only liquid taken in under the appetite of thirſt by the whole of the brute creation; and from thence it may be preſumed to be the liquid in general very well ſuited to the animal œconomy. That it is ſufficiently ſuited to man, will appear clearly from the great part of mankind who, during the courſe of their lives, take in no other. It is true indeed, that men in their infancy take milk from the breaſts of their mothers; and there are ſome people who take much milk through the courſe of their lives: but there are certain nations who have no domeſtic animals to afford this, and therefore for drink muſt depend upon water alone; and the ſtate of health in thoſe perſons who, from various cauſes, take water only, ſhows that this is perfectly well ſuited to the purpoſes of the human œconomy.

Simple water, therefore, that is, ſuch as nature affords it, is without any addition the proper drink of mankind. But though I have uſed the title of Simple Water, it muſt be remarked that nature hardly ever affords water perfectly ſimple, or without its being more or leſs impregnated with ſome other matters; and upon this account a diſtinction has been made of the natural waters, as being from different impregnations more or leſs proper for the uſe of man. How far this diſtinction is to be proſecuted, I dare not determine; but I am much diſpoſed to eſtabliſh this doctrine, That it is not to be proſecuted with much nicety, becauſe we are of opinion, that every natural water which has no impregnation ſenſible to the taſte or ſmell of a perſon of common ſenſibility drinking it, is very well fitted for the drink of mankind.

Still,

Still, however, it is obſerved, that certain waters which have neither taſte nor ſmell, are however diſcovered to have certain impregnations that may be conſidered as leſs ſalutary to mankind than more ſimple, or what may be called more pure water.

This may be ſuppoſed to take place eſpecially in the waters diſtinguiſhed as Hard and Soft. The former are impregnated with a portion of ſelenites, or other earthy matter, which renders them improper for certain purpoſes of domeſtic œconomy, and might be ſuppoſed to render them leſs ſalutary than purer and ſofter waters to the human conſtitution. Without entering, however, into any nice diſquiſition upon this ſubject, it will be enough to ſay, that the ſofter waters, when in our choice, are to be preferred: but at the ſame time we cannot diſcover that the harder waters, even when they have been very much and conſtantly employed, have been very evidently hurtful; at leaſt we can find no good or clear evidence of the bad effects that have been aſcribed to them.

I lived for many years in a large city in which the waters very univerſally employed were very hard, and although ſofter waters were within their reach, the moſt part of the people uſed only the hard. But among this people I found no endemic diſeaſes; and at leaſt none that I could impute to the water they drank, and certainly none that I did not find as frequent in a city which I have alſo practiſed in for many years, whoſe inhabitants very univerſally uſed no other than a very ſoft water.

Phyſicians have entered into ſtill nicer diſtinctions of common water, and have diſtinguiſhed them as they are Spring waters, Pit-well waters, River waters, or Lake waters; but there ſeems to be little foundation for diſtinguiſhing theſe from one another. Uncommon impregnations of ſome of them may upon occaſion take place; but we believe ſuch will always be apparent enough to prevent their being uſed. And with regard to their common ſtate, it is ſtill enough to ſay, that no impregnations which are not ſenſible to the ſight, taſte, or ſmell, are of ſo much conſequence as to deſerve our attention and choice in their employment.

On

On this ſubject it would be thought ſtrange if I ſhould omit to mention Rain and Snow water, about which ſo much has been ſaid. We have, however, only to ſay, that although theſe are perhaps the ſofteſt and pureſt of all common waters, yet I cannot perceive that in their uſe they give any advantages above others; and, on the other hand, we are perſuaded there is no foundation for ſuppoſing ſome of the particular bad effects of ſnow-water that have been aſcribed to it.

We conclude the whole ſubject with remarking, that the nice and accurate examinations that have been made of the ſtate of what I call Simple or Common Waters, were very commendable; but now they are made, they do not lead me to think that much nicety is neceſſary in the choice of them: and with reſpect to the bad effects imputed to ſome of them, we do not find there is any foundation for ſuppoſing that any of them can produce ſcrophula, fatuity, or other diſeaſes alleged to be endemic in certain countries.

The conſideration of mineral waters belongs entirely to another place.

SECT

SECT. II.

Of DRINKS *whoſe Baſis is Water, but to which Additions have been made by Nature or Art.*

TO be employed as drinks, various additions have been made to water; as the acid juices of fruits, farinaceous matters, aromatics, tea, coffee, and other vegetable ſubſtances. In ſo far as theſe, though joined with water, retain their peculiar qualities, the qualities of the drink made by ſuch additions, muſt depend upon the quality of the matter that has been added to the water; but as the qualities of theſe matters have either been treated of already under the title of Aliments, or are to be treated of hereafter under that of Medicine, it is not neceſſary here to conſider further the nature and qualities of ſuch drinks.

FERMENTED LIQUORS.

There are, however, ſubſtances which, joined with water, make the liquor undergo a conſiderable change, by its being ſubjected to a vinous fermentation: and as liquors thus prepared are employed as drinks in every civilized nation, they properly become objects of our particular attention, and are therefore to be conſidered here.

Theſe fermented liquors may be mentioned in the *firſt* place as of two kinds; one of them, prepared from the juices of fruits, and which, from the appellation of the principal ſpecies, we name WINES; the other, from a ſubſtance extracted by water from certain ſeeds or roots, which we name ALES: and we begin with the conſideration of the former.

On

On this ſubject we do not think it neceſſary to give the general doctrine of vinous fermentation, which we ſuppoſe to be commonly known. Here we ſhall only ſay, 1*ſt*, That we take it to be now well aſcertained, that ſugar, or ſubſtances containing it, and theſe ſo far only as they contain it, are the ſubjects capable of being changed by fermentation. 2*dly*, That by fermentation the ſugar is variouſly changed, and particularly that in part it is converted into alcohol, which I need not here define; and that it is the juice of fruits in conſequence of fermentation impregnated with a portion of alcohol, that properly and ſtrictly conſtitutes a Wine; and that it is the ſtate of this, with ſome other matters originally in the ſubject, more or leſs modified by the ſame fermentation, that gives wine all its different forms and qualities.

By its ſenſible qualities and other properties to be diſcovered in it, wine is found to be in different conditions; and it is our chief buſineſs here to take notice of theſe, and to inveſtigate their cauſes, ſo that we may better aſcertain the effects of particular wines both in diet and medicine.

To this purpoſe we would allege, that, in general, the different condition of wines depends partly upon the nature of the matter ſubjected to fermentation, and partly upon the circumſtances occurring in the conduct of this.

With reſpect to the firſt, the chief difference that occurs is in the quantity of ſugar it contains; and it ſeems only neceſſary to conſider this as it occurs in the juice of the grape, from which moſt generally wine is prepared.

The botaniſts commonly ſuppoſe that the vine is a plant of one ſpecies only; and that the diverſity which appears in its fruit, points out to them only ſo many inſtances of a variety, that by different cauſes may be produced in the ſame ſpecies.

For ought I know this may be juſt: As the vine is propagated by cuttings, the ſame variety may ſteadily continue to appear; and the cuttings having been taken from vines in different condition, we may have a variety of fruits, in which a difference in the nature of the ſubject may continue to appear: which, however, we ſtill ſuppoſe to be always determined by the quantity of ſugar they ſeverally contain.

This

This quantity, however, in any grape, may be varied conſiderably by different circumſtances. And, 1*ſt*, the kind of grape being given, the quantity of ſugar it contains may be different by the ſoil in which it grows, as this is more heavy or light; the latter giving leſs juice: but this more perfectly ripened, and therefore containing a greater proportion of ſugar.

2*dly*, It may be more or leſs ſaccharine according to the climate in which it grows. It is heat that gives maturity to fruits; and therefore to the production of the ſaccharine matter they contain: And with reſpect to the grape, it may be confidently ſaid, that, within certain bounds, the more heat the grape is expoſed to, the more maturity it acquires, and the more ſaccharine matter it will contain. It is aſſerted, that a certain temperature of climate is neceſſary to give the greateſt perfection to the grape; and that this is from the twentieth to the fiftieth degree of latitude on each ſide of the equator. This perhaps is not yet, by accurate obſervations, exactly determined; but it is pretty certain, that while beyond fifty degrees, the ripening of grapes is commonly imperfect, it is always more readily ſo as the climate is, within the bounds mentioned, nearer to the equator.

3*dly*, The ſaccharine matter of the grape will be always greater as the fruit is allowed to acquire more maturity, by remaining long on the tree where the climate allows of it.

4*thly*, It is to be obſerved, that the ſaccharine juice of the grape is often accompanied in the ſame fruit by acid and acerb juice; which may be conſidered as both diminiſhing the quantity of ſaccharine matter, and rendering it leſs fit for fermentation: and this happens both from the original nature of the grape and from its not attaining a full ripening. If the ripening, therefore, be not complete, as we know that all fruits ripen by degrees, and very often when the juice of the fruit in its central parts is fully ripened, there is an acid and acerb juice ſtill remaining in their cortical parts or huſks; ſo we find, that, according to the manner of the expreſſion of the juice, it comes out in a different degree of fitneſs for fermentation. What flows upon a ſlight preſſure only, is a more purely ſaccharine juice, while that flowing, in conſequence of more

more forcible expreſſion, is always leſs ſweet; and according to the greater force employed more acid or acerb.

Theſe are the circumſtances of the grape, which, according to their ſtate, may give conſiderable differences in the condition of wines.

In the *ſecond* place, we ſuppoſe the difference of wines to depend upon circumſtances in the conduct of the fermentation.

This at firſt is active, and ſomewhat violent, throwing up a great deal of the matter to the ſurface of the whole: but after a certain time, the briſk inteſtine motion becomes much leſs; and inſtead of throwing up matter to the ſurface, allows what had been formerly thrown up to fall down to the bottom. After this, however, ſome fermentation continues, though in a more ſlow and inactive manner, which may continue for a long time; and its doing ſo is neceſſary to a more complete aſſimilation, and therefore to the formation of a more perfect wine.

In this proceſs, the quantity of fermentable matter being ſufficiently large, the more active the firſt fermentation is, within certain bounds, the greater quantity of alcohol will be produced, and therefore a ſtronger wine; and the longer the ſlow fermentation is protracted, the more perfect will be the wine, and the more free from all other matters adhering to it. But if either the firſt active fermentation be hurried, or the ſecond fermentation be puſhed too far, the whole of the wine, or a part of it, will be converted into a vinegar of very different qualities from the wine, or from the parts of it which ſtill retain that nature.

From this view of the fermentation, it will readily appear, that what is frequently conſidered as a wine, and ſuch indeed as are moſt of the wines in uſe, it may contain three different matters. 1*ſt*, A portion of muſt, or unaſſimilated matter. 2*dly*, A portion of a proper wine, or in which, by the fermentation, a quantity of alcohol is produced; and, 3*dly*, A portion of vinegar produced by a too active or a too long protracted fermentation.

Theſe different matters will appear more or leſs copiouſly at the different periods of the fermentation. At an early period,

period, and in what may be called a new wine, the muſt will be moſt abundant. As the period of fermentation advances, the proportion of genuine wine will be more conſiderable; and if the fermentation has all along been properly managed, a vinegar will not appear but in very old wine; and from the proportion of theſe ſeveral matters, the qualities of wine depending upon the period and ſtate of fermentation, may be properly aſcertained.

New wines are eſpecially liable to a ſtrong degree of aceſcency when taken into the ſtomach, and thereby to occaſion much flatulency and eructations of acid matter. The uneaſy ſenſation of heartburn or of violent pains of the ſtomach from ſpaſms, is thereby alſo often produced; and the ſame acid matter paſſing out of the ſtomach, is liable, by a mixture with the bile, to produce painful ſpaſms or colics in the inteſtines, and of exciting violent diarrhœa.

Ripe and perfect wine, unleſs there is a fault in the ſtomach taking it in, is not ready to have theſe effects; and by the alcohol it contains, it is fit to ſtrengthen the ſtomach, and to promote a regular digeſtion. By the ſame alcohol alſo, it is fit to ſtimulate the whole ſyſtem, and proves thereby cordial and exhilarating; but by the ſame matter taken in larger quantity, it becomes intoxicating and a powerful ſedative.

Wines containing a portion of vinegar have thereby a proportion of their alcohol deſtroyed, and thereby the ſtimulant power of the wine leſſened. At the ſame time, though the vinegar be leſs liable to a hurtful aceſcency in the ſtomach than the unfermented juices; yet if there remains any ſuch unfermented matter in the other parts of the wine, or otherwiſe accidentally preſent in the ſtomach, the vinegar or acetous acid may, by exciting an acetous fermentation, occaſion very violent diſorders, and often more violent than thoſe ariſing from ſpontaneous aceſcency.

We have thus endeavoured to explain, in what manner wines may be in different conditions according to different circumſtances in the conduct of their fermentation; but we are far from being able to apply theſe diſtinctions to the wines in common uſe, as we are not ſufficiently acquainted with the various practices employed by the makers of wine in dif-

ferent countries; and much leſs with the various artifices employed by merchants or wine-dealers, to hide and diſguiſe the real ſtate of wines. Inſtead of entering upon theſe, we ſhall endeavour to ſay, how in ſome meaſure the nature of wines may be judged of by ſome of their ſenſible qualities.

Wines are of ſomewhat different odours; but what qualities theſe different odours point out is by no means aſcertained. In general, the peculiar odour of any wine being ſtrong and vivid, always implies both the moſt perfect and the moſt entire ſtate of ſuch wines, providing always that this is examined in wines of ſome age, as new wines under a more active fermentation may give out a more ſtriking odour; this, however, to be diſtinguiſhed by the experienced from that of a perfect wine.

With theſe circumſtances of odour are much connected the briſkneſs or flowering in the cup of wines, which always ſhows their being ſtill under ſome active fermentation; and for the moſt part that there has been a quantity of acid preſent in the original juice.

There are, however, wines very well ripened, and in which there is no very active fermentation ſubſiſting, that notwithſtanding will, upon a freſh application of air, and ſome agitation in being poured out, readily flower in the cup; but their being in no improperly active fermentation, will readily appear by the flowering paſſing again immediately away.

With regard to taſtes, ſome wines are conſiderably acid; and this muſt be owing to their having been made of juices containing much acid and little ſugar: and for which reaſons they are wines containing little alcohol. But it is to be obſerved of ſuch wines, that many ſtomachs are fitted to obviate their aceſcency; and as the acid in ſome meaſure obviates the ſtimulant power of alcohol, if ſuch wines are not directly refrigerant, they are at leaſt leſs heating.

We have mentioned above, that wines may appear acid from a quantity of vinegar formed in them: But this kind of acidity will be very readily diſtinguiſhed by the freſhneſs accompanying the former, and the vapid ſtate frequently attending the latter.

Many

Many wines are remarkably ſweet, and may be ſo from different cauſes. It ſometimes depends upon the original ſweetneſs of the grape, not to be entirely obliterated by any fermentation; and by a complete fermentation the ſame may be made into the moſt perfect wines. The ſweet wines, however, may be always ſuſpected of retaining a portion of unaſſimilated matter, eſpecially when the active fermentation has been induſtriouſly checked; and unleſs theſe circumſtances are compenſated by a large proportion of alcohol produced in them, they will always be ready to ſhow the effects of unaſſimilated matter remaining in them.

Wines may be more rough, and ſomewhat ſtyptic or more ſoft and ſmooth to the taſte. The former commonly accompanies the acid wines, and may be owing to the original acidity or acerbity of the fruit; but moſt commonly it is owing to the juice of the huſk taken out by too ſtrong expreſſion; and that even from grapes otherwiſe containing a great deal of ſaccharine matter. It is a quality that renders wines more aſtringent; but unleſs as depending on the cauſes diſpoſing it to much aceſcency, it is otherwiſe innocent. It appears always moſt conſiderable in new wines, and is much ſmoothed by a long protracted fermentation. Hence ſoft and ſmooth wines, whilſt they ſhow both the original juice to have been free from any acerbity, they preſume alſo the moſt perfect fermentation.

We have now only to take notice of wines that are diſtinguiſhed by their colour; which, as it is ſo frequently given by art, renders us very uncertain of the qualities that would have been in the colourleſs liquor.

So far as the red colour of wines is without the addition of colouring matter, I believe it is always taken from the colour of the huſks ſubjected to the firſt fermentation of the juice; and therefore gives to theſe juices, and the wine made of them, ſome degree of roughneſs and aſtringency: and if the conduct of the fermentation is otherwiſe the ſame, it is only in this quality of a ſlight aſtringency that we can perceive red wines to differ from white. It is, however, poſſible, that as wines are at firſt intended to appear white or red, that they may be ſubjected to a different management in the fermentation, and thereby may differ more conſiderably in a manner that I am not acquainted with.

We have thus endeavoured to point out the different condition of wines, and to assign their several causes; and we might now make some remarks on the wines that are made from the juices of other fruits than that of the grape, as those of apples, pears, cherries, and also of those made in imitation of wine from sugar or honey. But we are persuaded, that the principles laid down with respect to the wine made of the juice of the grape, will apply to all the other kinds mentioned; and we have now only to say somewhat of the other principal species of fermented liquors which are called Ales.

Fermented liquors affording alcohol may be made from the roots of several vegetables; but these, so far as I know, have not been made into potable liquors: and these liquors, or what I call Ales, have only been prepared from farinaceous seeds.

These, by malting, or by exciting and conducting their germination to a certain degree, have always a sugar evolved, and rendered evident in their farinaceous substance; and this saccharine matter extracted by water subjected to a fermentation analogous, and very similar, to that of wines, gives our ales containing a quantity of alcohol. They have, therefore, in general, the cordial, exhilarating, intoxicating, and sedative qualities of wine.

These ales, like wines, are found in various condition, depending partly upon the quantity and condition of the saccharine matter employed, and partly upon the management of the fermentation they are subjected to.

Ale may be prepared from any of the Cerealia. Barley has been chiefly employed, and we think properly, as its germination is most easily conducted; and that under its germination, it gives out its sugar most readily and in greatest quantity: and though the other farinacea may be employed, it is alleged, that they would severally give an ale of a different quality. This, however, we judge to be without foundation; and are persuaded, that the ale prepared from the other farinacea, would not show any essential differences from that of barley. SPIELMAN says, that ale prepared from oats is bitter; but I have seen it often prepared from that grain without any bitterness, and proving in every respect a very

very perfect ale; hardly to be distinguished in any quality from that made of barley.

Now, however, to speak of ales made in the ordinary manner, they will be stronger or weaker according to the quantity of the saccharine matter employed in them: which will be more or less according to the quantity of well-ripened farina in the barley employed; according to the more or less exact conduct in the malting of it; according to the proper and complete extraction of the saccharine matter by water; and when a large proportion of water has been necessarily employed for a more complete extraction, according to the dissipation more or less of a quantity of the superfluous water.

These are the circumstances, according as they are managed, which give strength or weakness to ales; and with respect to their other qualities, they will depend upon the conduct of the after fermentation.

The infusion of malt or wort, as it is called, is not so well disposed to fermentation as the juices of fruits, and therefore requires a ferment to be added to it; and that being added, the conduct of the fermentation is very much the same with that of wines; at first very active, and afterwards slowly protracted for a long time: but however managed, it is very doubtful if the ale ever can be rendered so perfect and complete as in the case of wine. It is probable, that in most ales, there is a large portion of unassimilated farinaceous matter, which therefore renders ales more nourishing than wines; but, for the same reason, ales, *cæteris paribus*, are more than wines liable to acescency in the stomach. It is commonly supposed, that the viscidity of worts is never entirely corrected by the fermentation; and therefore that ales are more ready than wines to fill the vessels of the human body with viscid fluids: but I am persuaded that this deserves little attention, as it is probable that the power of the gastric fluid, and of the fermentation which happens in the stomach and intestines, reduces the whole nearly to an equality in respect of fluidity.

These are the observations I have to make with respect to ales in general; and with respect to the various conditions that ales may be in, I expect they will be readily understood from what we have said above on the differences of wines, as depending

depending partly upon the difference of the fermentable ſubject, partly upon the different conduct of the fermentation, and eſpecially upon the different period of fermentation at which the liquor is taken.

On the ſubject of drinks, it is proper for me to obſerve, that inſtead of fermented liquors, which have their qualities chiefly from the alcohol they contain, it has been common to ſeparate the alcohol, and in its ſeparate ſtate to employ it in the compoſition of our drinks. It is often ſo employed by the addition of water alone; ſometimes joining a little ſugar, and ſometimes joining both ſugar and a portion of acid, for the moſt part the juice of lemons; and this compoſition makes the liquor named PUNCH. It is not neceſſary to proſecute this diverſity here; for it is enough to our purpoſe to ſay, that alcohol ſeparated from the fermented liquor in which it is produced, is always a more ſtimulant, inflammatory, and narcotic matter, than when it was blended with the other parts of the fermented liquor. The dilution of it with water alone may moderate theſe qualities, but not in any great degree; and the blending it with ſugar, and the juices of fruits, may do it ſtill more, but never entirely.

In theſe practices, it is common to employ the alcohol as it is diverſified by the different fermented liquors from which it is drawn; and thus diverſified, it may carry along with it certain oily matters, which render it more agreeable to the palate, perhaps to the ſtomach, of particular perſons: but I would maintain that theſe different ſtates of it in arrack, rum, brandy, or malt-ſpirit, do not differ from one another in the eſſential qualities of alcohol, and very rarely in their effects on the human conſtitution.

CHAP.

CHAPTER IV.

OF CONDIMENTS.

ALTHOUGH theſe are not properly alimentary matters, or become ingredients in the compoſition of the animal fluid, yet as they are taken in with the proper aliments, and modify the digeſtion and aſſimilation of theſe, they are properly treated of in this place.

They are of two kinds, ſaline or acrid, having this acrimony for the moſt part reſiding in their oily parts. Of the firſt, the chief is ſea-ſalt; and it is eſpecially employed for preſerving meat before it is employed in diet for a longer time than it could be otherwiſe preſerved from putrefaction.

For this purpoſe it muſt be applied in large proportion, and ſo incorporated with the ſubſtance of the meat, that it cannot be again waſhed out before the meat is employed in diet. It happens, therefore, that when ſalted meats are employed in that condition, the ſalt is often taken in in large quantity, and diffuſed in the maſs of blood. If the ſalted meats, however, be taken in moderate quantity only, the ſalt has the effect of exciting the powers of digeſtion; and ſuch meat is often more eaſily digeſted than entirely unſalted meats are.

But when ſalted meats are taken in in large quantity, and make the greateſt part of the diet, the ſalt increaſes greatly the ſaline ſtate of the blood, and induces all the ſymptoms of ſcurvy. This indeed of late is a doctrine diſputed: and it would

would not be proper for us to enter into the controverſy here; but if it were, we are perſuaded that our opinion could be well ſupported, and that the arguments on the other hand might be ſhown to be fallacious and falſe.

If it ſhould be found that the ſerum of the blood in ſcorbutic perſons proves antiſeptic, as has been alleged, this may imply that ſuch ſerum is in itſelf not putrid, and which indeed is not neceſſarily to be ſuppoſed in ſcurvy; but ſuch ſerum cannot certainly prove antiſeptic, but by its containing a larger proportion than uſual of ſaline matter. Nothing can appear to me more extraordinary than Dr. LIND's aſſertion, that the ſerum of the blood in ſcorbutic perſons is not anywiſe acrid to the taſte; for in numberleſs trials, I have never found the ſerum of the blood in the ſoundeſt perſons without an acrimony diſcoverable by the taſte: and if the ſaline efflorescence on the ſurface of the body, which Dr. HULME takes notice of, be common, as I believe it is, in ſcorbutic perſons, it is an irrefragable proof of the ſaline ſtate of the blood in ſuch perſons.

Having thus mentioned the effects of a large proportion of ſea-ſalt introduced into the body, it is, however, to be obſerved, that a certain quantity of it is neceſſary to the human œconomy. This appears from the deſire of ſalt being an inſtinct univerſal in the human ſpecies, and from its being univerſally what gives reliſh to almoſt every kind of food. This reliſh of ſalt is an inſtitution of nature, the efficient cauſe of which we cannot explain; but we preſume very confidently, that it is adapted to ſerve ſome beneficial purpoſe in the œconomy, although we do not well underſtand either the cauſe or the purpoſe of this.

We can perceive very clearly that it proves a ſtimulus to the ſtomach, and may thereby promote its action, and therefore the digeſtion performed there; but this ſtill does not ſufficiently explain its being ſo conſtantly neceſſary. We might think of its antiſeptic powers which might be uſeful in the human œconomy; but its poiſonous quality in carnivorous animals, and the utility of it in the phytivorous, turns us off entirely from all our views of its antiſeptic powers in the ordinary uſe of it. On the contrary, we might take up with the late Sir JOHN PRINGLE's opinion, that though in large quantity

quantity applied it is antiſeptic, yet in ſmall quantity it has contrary effects. This, however, is a doctrine not yet with me ſo well eſtabliſhed that I can venture to apply it, or find that it will obviate the difficulties occurring upon this ſubject.

On this ſubject of ſaline condiments, it ſeems proper to obſerve, that nitre is frequently employed and joined with ſea-ſalt as an antiſeptic in preſerving meat for ſome time before it is to be employed in diet. As nitre in every proportion is a powerful antiſeptic, we have no doubt of its anſwering the purpoſe mentioned; but as it is commonly uſed in ſmall proportion only, we believe that the particular effects of it in the human body are not to be perceived.

Another ſaline ſubſtance employed as a condiment, is ſugar. The qualities of this as a nutritious matter we have ſpoken of above; and the qualities of it as a medicine we ſhall ſpeak of hereafter. We have now to conſider it as a condiment only; and in this view it is certainly antiſeptic, and is therefore properly employed in preventing the putrefaction of animal ſubſtances.

It is alſo frequently applied to vegetables; but the preparation of boiling, which is commonly neceſſary in order to their being impregnated with the ſugar, for the moſt part diſſipates their volatile and active parts; ſo that ſuch are the condita, except a few that contain a large proportion of a more fixed aromatic ſubſtance, that none of them can be conſidered as any thing elſe than a maſs of ſugar.

This is often applied to the acid and aceſcent fruits; and when applied in the conſiſtence of a ſyrup, it preſerves them for a long time from any fermentation, but it does not deſtroy their aceſcency: and when ſuch PRESERVES are taken into the ſtomach, the ſugar introduced along with them renders them much diſpoſed to an aceſcent fermentation.

In the quantity that ſugar is commonly employed, either for improving the reliſh of ſeveral kinds of food, or for correcting their acidity, it can only be hurtful by its aceſcency in the ſtomach, and can hardly make any proper part of the maſs of blood. Although the experiments of the late ingenious Dr. STARK are hardly deciſive on this ſubject, I am ready,

ready, however, to believe, that if it is taken in very large quantity, and in greater proportion than it can enter into the compoſition of the animal fluid, it may increaſe the ſaline ſtate of the blood, and may induce various diſorders.

Another ſaline condiment yet to be taken notice of is that of vinegar. It is a powerful antiſeptic, and may be employed in ſeveral ways for preſerving animal ſubſtances from putrefaction: and if we may believe what was ſaid above with reſpect to acid in general, as entering into the compoſition of the animal fluid, we muſt conſider vinegar as a vegetable acid that may be employed or thrown into the body with more ſafety than the foſſil acids, though theſe are in experiments out of the body more powerful antiſeptics. Animal food preſerved by vinegar is hardly ever ſo much impregnated with it as to be rendered leſs digeſtible or leſs nutritious. It renders it only leſs putreſcent; and therefore it is a condiment of animal food that is in every reſpect ſuited to the human conſtitution.

Vinegar is alſo employed in the preſervation of vegetables from every fermentation, whether aceſcent or putrefactive. The vegetables ſo preſerved are called PICKLES; and a great variety of vegetables is employed in making ſuch: but the boiling that is commonly required diſſipates ſo much of the volatile and active parts that the peculiar qualities of the vegetable hardly ever remain; and almoſt the whole of our pickles may be conſidered as having no other quality but that of the vinegar they are impregnated with.

This is certainly, as other acids are, often uſeful in exciting the action of the ſtomach, and thereby promoting appetite and digeſtion; and if it be duly prepared by a very perfect fermentation, it will check rather than favour the aceſcency of vegetable matters in the ſtomach. This is an advantage which it has over the native acid of vegetables, which very often in the ſtomach runs into an aceſcent fermentation, and readily alſo excites it in other ſubſtances there.

It is, however, ſtill to be remarked, that acids, and eſpecially vegetable acids, although in a certain quantity they may excite the action of the ſtomach, yet in a larger quantity, and in certain ſtomachs, they prove truly refrigerant, and conſiderably

conſiderably weaken the tone of the ſtomach, ſo as thereby to prove hurtful in the gout and ſome other diſeaſes.

Theſe are the ſeveral condiments of the ſaline kind; and we have ſaid that there is another kind taken from the vegetable kingdom, which I have put under the general title of Acrids, but which again may be divided into two kinds: the one, of aromatics imbued with peculiar and pretty ſtrong odours; and the other, of more ſimple acrids imbued with little peculiar odour.

The aromatics are ſuch ſubſtances as contain a large proportion of eſſential oil. They may be conſidered as eſpecially of two kinds; thoſe produced in the torrid zone containing an oil of greater ſpecific gravity than water, but of ſome volatility, and at the ſame time acrid and inflammatory as applied to the ſenſible parts of our bodies.

The other aromatics are thoſe afforded chiefly by the verticillated or umbelliferous plants of Europe. They are of leſs ſpecific gravity, and of leſs acrimony, but of more volatility.

The whole of the eſſential oils are more or leſs antiſeptic. Camphire, which I conſider as of the number, is in this reſpect the moſt powerful; and the whole of the eſſential oils ſeem to have the ſame quality, as approaching to the nature of that. The camphire, however, as diſagreeable both in taſte and odour, is not, that I know of, employed as a condiment; while the others, from their agreeable odour, are the moſt frequently.

They are employed in two ways: firſt as antiſeptics, and joined with the ſaline matters above mentioned, for preſerving meat from putrefaction before it is to be employed in diet; or, ſecondly, they enter into our ſauces, and are taken in with our food, either to render theſe more grateful and ſapid, or by the ſtimulus they give to the ſtomach to aſſiſt in digeſtion. One ſpecial purpoſe may be, that their volatile parts, by mixing with the air ariſing from the aliments, they may excite the action of the alimentary canal, and aſſiſt in the expulſion of the air diſtending it. With reſpect to this purpoſe, the qualities of the ſeveral aromatics will be taken notice

notice of hereafter, when they are to be conſidered as medicines.

With reſpect to them as condiments, we have only to obſerve further, that in moderate quantity they may promote digeſtion, and prove carminative, which ſhows that they are moſt properly employed with a vegetable diet: but as in large quantity they are ſtimulant and heating to the ſyſtem, they are not neceſſary with animal food; and their frequent repetition renders an increaſe of their quantity conſtantly neceſſary, and thereby they certainly weaken the tone of the ſtomach.

Beſides the aromatics, the acrid ſubſtances employed as condiments are eſpecially taken from the claſs of tetradynamia, and they are chiefly the *Muſtard* and *Horſe-radiſh*. They are chiefly employed as taken in along with our food, and they certainly ſtimulate the ſtomach and aſſiſt digeſtion; and further, as they evidently promote perſpiration and urine, they obviate the putreſcent tendency of the ſyſtem. This has been ſo much remarked, that the vegetables of this claſs, as fraught with this peculiar acrimony, are juſtly denominated Antiſcorbutic. It will readily appear, that from the quality mentioned, theſe ſubſtances are as well ſuited to be uſed with our animal food as the aromatics are to be the proper condiments of our vegetable aliments.

Akin to the tetradynamia, and containing an acrimony nearly of the ſame quality, are the plants of the garlic tribe.

Thoſe of the milder kind, as the onion and leek, and eſpecially when deprived of their acrimony, afford a great deal of nutritious matter; and ſo far as theſe, with the eſchalot and others, are taken in as condiments, they are extremely ſafe and proper. The more acrid of this genus, as the garlic, is almoſt only employed as a condiment; and where the odour and taſte can be admitted, it certainly ſtimulates the ſtomach very ſtrongly, and promotes digeſtion. As promoting perſpiration and urine, the whole of this order of plants are, with the tetradynamia, properly joined with our animal food, and juſtly alſo reckoned among the antiſcorbutics.

Amongſt

Amongſt the condiments, there is one ſometimes employed which I cannot refer to any general head; but its odour, reſembling in ſome degree that of the garlic I have been juſt now ſpeaking of, minds me of it in this place. This is the *Aſafœtida*, which in the countries producing it is of a leſs diſagreeable odour, and much employed as a condiment; and to ſuch perſons of this country as can admit of its odour, it proves grateful to the taſte and uſeful in promoting digeſtion.

Of the more ſimple acrids, the firſt that deſerves to be mentioned is the *Capſicum*; which is without odour or particular taſte, and is ſo readily diffuſible that it joins agreeably and conveniently with any other condiment or ſauce. It ſeems to ſtimulate the ſtomach and promote digeſtion, and taken in largely is certainly amongſt the moſt heating of the condiments.

Theſe are the chief of the condiments; but they are ſeldom employed ſingle, but variouſly combined to form a variety of ſauces added in the kitchen or upon the table. What commonly makes the foundation of theſe, is what is called Ketchup. This is properly, in the firſt place, made of muſhrooms, under a certain fermentation, probably putrefactive; and after it has undergone this, a variety of aromatics are added, as may be agreeable to the taſte of particular perſons. What the whole derives from the muſhrooms, I cannot perceive; and think the ketchup, and many other compoſitions daily preſented to the public, may all be conſidered as combinations of ſalt, vinegar, and aromatics: and from hence I think their qualities may be underſtood.

Another famous ſauce and condiment is what is called Soy, which we have only as imported from the Eaſt Indies. By the beſt accounts I can find, it is a preparation from the ſeeds of a particular ſpecies of the *dolichos*. It appears to me to be prepared by a particular fermentation of the farina of this ſeed in a ſtrong lixivium of common ſalt. Its taſte is chiefly ſaline, with very little aroma; and its peculiar qualities, different from the other combinations mentioned, I cannot perceive.

I conclude this article of condiments with obſerving, that the whole of our ſeaſonings conſiſt of ſalt, vinegar, and aromatics, combined together, and if they are taken only in the quantity

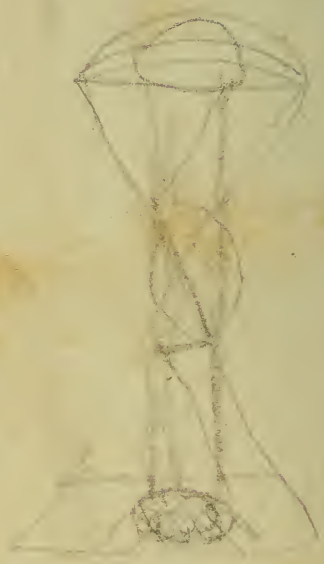
quantity neceſſary to render the food more ſapid, they may increaſe the appetite and favour full eating; but they can hardly otherwiſe do harm, unleſs when the aromatics are taken in ſuch large quantity as to weaken the tone of the ſtomach in the manner we have mentioned above.

AFTER peruſing what has now been ſaid upon the ſubject of aliments, ſome of my readers may perhaps allege, that in marking the difference of aliments more nicety has been expreſſed than was neceſſary, as the moſt part of mankind do not either feel or perceive the effects of thoſe differences of diet.

It is indeed true that the generality of mankind do not perceive the differences of diet very nicely; becauſe man is of a nature ſuited to a great variety of functions, and therefore to a great variety of ſtates and circumſtances, and among the reſt to a great variety of aliments.

To this the human œconomy is particularly well ſuited; and the common ſaying of *Sanis omnia ſana*, to a certain extent, is well founded; but this does not ſuperſede all attention to the choice of aliments. Men are ſtill of different conſtitutions with reſpect to their powers of digeſtion, nor leſs different with reſpect to the irritability of their ſyſtem, and are conſequently variouſly affected by the ſame aliments; and this ſo much as to have produced the vulgar obſervation, that *One man's meat is another man's poiſon*. This indeed does not apply in many caſes, and only very remarkably in the caſe of the idioſyncraſies, which occur in ſome particular perſons.

With reſpect to the moſt part of mankind, the different effects of aliment are not very remarkable; and though ſome exceſſes may take place, they are often tranſitory and unheeded: but it would be of conſequence for men to know, that repetition may in time render theſe effects conſiderable and dangerous. It were well, therefore, that mankind were aware of the tendency which every kind of diet has to produce effects either

either immediately, or after repetition, unfavourable to health. It would, however, be difficult to give to the bulk of mankind the neceſſary inſtruction on this ſubject, and it would hardly be neceſſary to render it very univerſal, as it is not in many caſes, and only in particular perſons, that diſeaſes ariſe from errors in diet; but it is abſolutely neceſſary that phyſicians who have the whole of mankind as objects of their attention, ſhould ſtudy this matter; without which they cannot either perceive the cauſes of diſeaſes, or direct the means of obviating them. In this buſineſs, however, I have often found phyſicians very deficient, from their great ignorance of the nature of aliments, and of the principles which ſhould lead to the proper and neceſſary diſtinction of them. To ſupply this deficiency, and to give the neceſſary inſtruction, the foregoing treatiſe has been attempted; and though in ſome particulars it may be both imperfect and miſtaken, I flatter myſelf that it gives the neceſſary principles more fully and juſtly than they had been given before, and at leaſt points out the neceſſary ſpeculations that muſt be entered into for aſcertaining the nature of aliments more exactly. In all this I cannot have been too minute; and I cannot be of more ſervice than by engaging phyſicians in a minute ſtudy of the ſubject.

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